UNIVERSAL IMMUNIZATION PROGRAMME

CONDUCT DISEASE SURVEILLANCE

Ministry of Health and Family Welfare
Government of India
New Delhi
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CONDUCT DISEASE SURVEILLANCE

Based on the WHO module - Conduct Disease Surveillance

TABLE OF CONTENTS

CONDUCT DISEASE SURVEILLANCE

INTRODUCTION

Surveillance is DATA COLLECTION FOR ACTION. Specifically, for the Universal Immunization Programme (UIP), surveillance is the collection of data about cases of the target diseases and the use of the data to improve action to prevent these diseases.

Surveillance information can help you in planning your programme and also in evaluating it. The data will enable you to monitor the effectiveness of the immunization activities and to identify problems. You will be concerned with problems which prevent children from receiving vaccine ("coverage problems") and problems which risk harming the vaccine ("vaccine problems").

If your programme is successful, it will help you by recording a drop in the number of cases and deaths.

To plan and evaluate vaccination activities, you will need to know:

WHO get the diseases,
HOW MANY get them,
WHERE they get them,
WHEN they get them,
WHY they get them.

Information collected must be used either for planning, monitoring and evaluation of the programme. **There are 5 steps to surveillance which must be carried out at all levels, starting from the PHC.** These are:

1. Collection of data.
2. Compilation of data
3. Analysis.
4. Action.
5. Feedback.

This module describes the tasks to be performed to conduct disease surveillance at the health centre and district levels.

STATEMENT OF PURPOSE

In this module you will practice skills which will enable you to conduct disease surveillance at the level of the vaccination activity for which you are responsible.

FLOWCHART

The diagram is a flowchart of the tasks to be performed in a disease surveillance system. Each block (□) represents a major step. Read the blocks from left to right or as the arrows indicate, starting with block 1.0. The diamond-shaped block (◇) indicates that a decision must be made. Based on the decision (yes or no), follow the arrow to the appropriate next block.

1.0 PREREQUISITES FOR EFFECTIVE SURVEILLANCE

The data collected should be **UNIFORM** and **REGULAR** for it to be useful.

As a manager responsible for surveillance activities in your area you must have :

* standard case definitions; and

* lists of all units which are expected to report to you.

1.1 STANDARD CASE DEFINITIONS

Standard case definitions are important to ensure uniformity in reporting. There will be many people at various levels who will be involved in the surveillance activities. They must know which cases to include in the reports.

There are various methods of collecting data. We will discuss these later. But the same case definitions will apply to all the methods.

The classification of the cases has been given broadly as suspect, probable and confirmed. For the purposes of our surveillance system all cases listed under "probable" should be taken as a positive case. If facilities permit investigate all suspect cases to confirm diagnosis. **All suspect cases of poliomyelitis and neonatal tetanus, however, must be investigated within 2 days.**

- **suspect** : diagnosis made on clinical grounds by the health workers;

- **probable** : diagnosis made on clinical grounds by a medical officer; and

- **confirmed**: clinical diagnosis by a medical officer and/or positive laboratory identification of the disease.

1.1.1 **NEONATAL TETANUS**

Suspect neonatal tetanus

- History of normal suck or cry for the first 2 days of life AND
- History of onset of illness between 3 and 28 days of age AND
- History of inability to suck followed by stiffness and/or "convulsions" AND
- Death

Probable/Confirmed neonatal tetanus

- Suspect case AND
- Typical findings on physical examination: inability to suck (trismus), and/or stiffness (generalized muscle rigidity, and/or Convulsions (muscle spasms).

1:1.2 **TETANUS**

Suspect tetanus

History of injury or ear infection followed by difficulty in opening mouth (or jerking of the mouth) or stiffness of the neck or body.

Probable tetanus/confirmed tetanus

Suspect case AND

Typical findings on physical examination: trismus, rigidity of muscles or generalized spasms.

1.1.3 **POLIOMYELITIS**

Suspect poliomyelitis

-History of fever AND

-History of abrupt onset of weakness or paralysis of the leg(s), and or arm(s) and or trunk AND

-History of no progression of paralysis after the first 3 days AND

-History that paralysis was not present at birth or associated with serious injury or mental retardation.

Probable poliomyelitis

-Suspect case AND

-Typical findings on physical examination: flaccid paralysis, no sensory loss, muscle tenderness, wasting of the affected muscles (late findings), absent or depressed deep tendon reflexes, asymmetrical findings.

NOTE: Cases with onset of the disease 3 months or more prior to the examination of the child should be listed under "residual paralysis due to polio" and not as acute cases.

Confirmed poliomyelitis

- Probable case by history and physical examination AND

- Any one of the following

  * positive virus culture for poliovirus

  * positive serology (four-fold or greater rise in serum polio antibody titres).

  * residual paralysis 60 days after onset of illness.

1.1.4 **MEASLES**

Suspect measles

- History of fever and rash and any one of the following:

  - cough
  - running nose
  - red eyes.

Probable measles

- History of a generalized blotchy rash lasting three days or more;

- History of fever 38 degree C (101 degree F) or more (if measured);

- History of any one of the following:

    - cough
    - running nose (coryza)
    - red eyes (conjunctivitis).

AND any one of the following:

- Typical findings of physical examination: temperature 38 degree C (101 degrree F) or more, cough, coryza, conjunctivitis, maculopapular rash;

- exposed to a suspect case of measles in previous 3 weeks (incubation period 1-2 weeks);

- epidemic of measles in the area;

- Koplik's spots.

Confirmed measles

- Probable case by history and physical examination, AND

- Positive serology (four fold or greater rise in serum measles antibody titres);

NOTE: Many children come for treatment only for post measles complications. Careful history should be taken for all children with pneumonia and diarrhoea.

1.1.5 **WHOOPING COUGH (PERTUSSIS)**

Suspect whooping cough

- History or observation of repeated severe cough AND

- History or observation of any one of the following:

    - cough persisting 2 or more weeks;
    - fits of coughing;
    - cough followed by vomiting.
    - typical whoop in older infants and children.

Probable whooping cough

- suspect case AND
- Any one of the following:

  * typical findings on physical examination in young infants prolonged coughing followed by a period of apnoea and cyanosis, coughing followed by a typical breath intake and "whoop", fits of severe coughing, coughing followed by vomiting, subconjunctival haemorrhages;

  * exposed to a suspect case in the previous 3 weeks (incubation period usually 7-10 days);

  * epidemic of whooping cough in the area;

  * white blood cell count with 15 000 lymphocytes/cu.mm. or more.

Confirmed whooping cough

- Probable case AND
- Positive culture or immunofluorescence of nasopharyngeal secretions for Bordetella pertussis bacteria.

NOTE: Some of the children may come for treatment following complications or secondary infection. Careful history must be taken of all children with bronchopneumonia or severe diarrhoea.

1.1.6 DIPHTHERIA

Suspect diphtheria

- Sore throat (with or without difficulty in swallowing), mild fever, greyish-white membrane, with or without difficulty in breathing.

Probable diphtheria

- Suspect case AND
- Any one of the following:

typical findings on physical examination:

* airway obstruction;

* myocarditis or neuritis (paralysis) 1 to 6 weeks after onset of symptoms;

* exposed to a suspect case of diphtheria in the previous 2 weeks (incubation period 2-7 days);

* epidemic of diphtheria currently in the area;

* death;

* common alternative diagnoses excluded by appropriate tests: negative throat culture for group A streptococci, negative blood tests for mononucleosis.

Confirmed diphtheria

- Probable case AND
- Positive culture of Corynebacterium diphtheriae (demonstration of toxin production recommended, but not required, in typical cases; microscopic examination of a direct smear of a clinical specimen is not sufficiently accurate to substitute for a culture).

1.1.7 TUBERCULOSIS IN CHILDREN UNDER 5 YEARS OF AGE

There are major differences between tuberculosis and the other target diseases. The latter are all acute, with characteristic symptoms and of relatively short duration but infection with tuberculosis causes a chain of events over a different time scale.

A child is infected from a person who is coughing up tubercle bacilli. When the child is under five years of age that person is usually within the household or very close to it. Infection can also be transmitted through contaminated unboiled milk.

Infection is in one or both lungs. From that infection bacilli quickly reach the lymph nodes at the lung root. These enlarge as the tuberculous process develops and the lung lesion and the enlarged nodes together form the "primary complex".

When infection is from milk, the primary focus is usually in the intestinal tract with nodes in the mesentery. Occasionally a focus in the pharynx causes regional nodes in the upper part of the neck.

Whether in lung or abdomen, bacilli from the "primary complex" spread throughout the body causing small "seedings" in other tissues such as bones or brain.

In most cases these events occur without any clinical illness but if nutrition is poor or resistance low the primary complex or the "seedings" may extend and illness follows.

When this happens the illness usually comes on slowly over weeks rather than days as extension in the lung or spread in the blood overcomes the body defences.

Clinical illness is most likely to occur within a year after infection but it can do so years later if resistance is reduced. It may also follow any acute infective illness but particularly measles or whooping cough.

Suspect tuberculosis

- An ill child with a history of contact with a suspect or confirmed case of pulmonary tuberculosis;

- Any child

* who does not return to normal health after measles or whooping cough;

* with loss of weight, cough and wheeze who does not respond to antibiotic therapy for acute respiratory diseases;

* fever more than four weeks not responding to routine therapy.

* with abdominal swelling, hard painless mass and free fluid;

* with painless firm or soft swelling in a group of superficial lymph nodes;

* with any bone or joint lesion of slow onset;

* with signs suggesting meningitis or disease in central nervous system.

Probable tuberculosis

- Suspect case and any one of the following

* positive >10mm induration on tuberculin reactions;

* suggestive radiological appearances on films of chest, bones or joints;

* favourable response to specific anti-tuberculosis therapy.

* suggestive histological findings in biopsy material;

Confirmed tuberculosis

- Probable case AND

* the detection by microscopy or culture of tubercle bacilli from secretions or tissues, or

* identification of the tubercle bacilli as Myco tuberculosis by cultural characteristics.

1.2 REGULARITY OF REPORTS

The second most important function in your surveillance activities is to ensure the regularity of the reports. For this you would need to keep a list of all reporting units in your area. Make sure that they send you the reports in time and that the reports are complete.

If you are in charge of a unit make sure that you send the reports in time. Check that the report is complete in all respects. Even if there is no case you must send a NIL report.

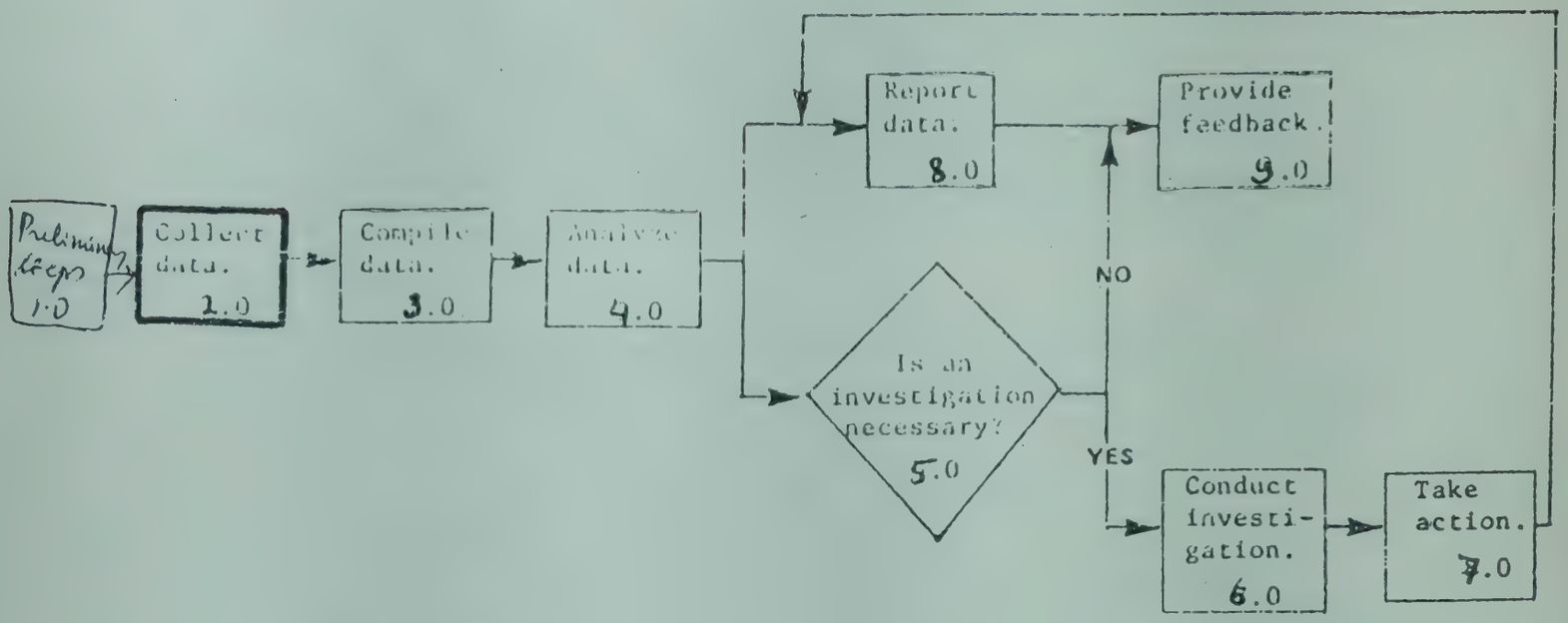
1.3 ANALYSE AND USE DATA LOCALLY

Information collected locally should be analyzed locally. Then the people who actually conduct the vaccination activities can monitor the effect of their work and, if necessary, change or improve their method of work so they can meet their disease-reduction objectives.

Although the primary purpose of gathering surveillance data at the local level is for use at this level, it is also important that data from each local area be reported to the next higher level. The supervisor there can then analyze the data from the entire district or state and inform you of situations which could affect the vaccination activities in your area. The procedures you will follow to collect and report surveillance data will be determined at the state and national level. The state and national office will specify:

* which information to gather,
* how often to compile the information,
* how often to report the information, and
* which forms and format to use to report the information

These procedures are already in use, and you are familiar with them. Be sure you understand and follow them properly.



2.0 COLLECT DATA

You are responsible for immunization activities in your area. **Your major objective is to prevent diseases from occurring by immunizing pregnant women and infants.** Your district is covered under UIP and you propose to immunize all pregnant women and infants. If you have achieved your goal and the vaccines you administered were also potent you would only have a negligible number of cases in your area.

You must organise an effective surveillance system to demonstrate the effectiveness of your programme in the control of the diseases. You will do this by collecting data on the cases and deaths due to these diseases in your area. You can chose different methods to do this. Which ever method you chose make sure that it is implemented properly. Remember, that the analysis of the data and the conclusions you draw will depend on the quality of the information you have collected.

2.1 METHODS OF COLLECTING DATA

Some of the methods used for collecting data are:

* Routine (institutional-based or passive) reporting
* Active surveillance (search for cases in the community)
* Sentinel surveillance
* Disease surveys
* Outbreak investigations
* Laboratory surveillance

At the health centre level routine reporting is usually followed. This must be improved by better diagnosis and complete reporting. You would also need to supplement the information through active surveillance for selected diseases. This is specially important in areas where high levels of immunization coverage has been achieved.

The district level should in addition establish the sentinel surveillance system as well as conduct periodic surveys for lame children.

2.1.1 ROUTINE (INSTITUTIONAL BASED OR PASSIVE) REPORTING

This is the simplest and most widely practised way of collecting information. All the cases attending the OPDs are recorded. At the end of the month the total numbers are compiled. The number of cases thus refer only to those who come for treatment.

You must give careful attention to the history and clinical picture of the vaccine preventable diseases and diagnose them properly. Many children will come with complaints of cough or fever. These are common presenting symptoms for many childhood diseases. But by careful questioning and examination of the child it is possible to identify reasonably well the vaccine preventable diseases.

You must keep your records in such a way that it will be convenient and easy to compile the reports. You may consider :

* Keeping separate pages in the outpatient register for vaccine preventable diseases. Record the patients' name, address, age, immunization status, and date of onset of disease.

You do this to make sure that all the cases that have been diagnosed are compiled correctly and easily.

* You may also want to keep a tally sheet. This will be particularly useful if there is heavy attendance in your OPD and a large number of cases are seen.

Tally Sheet - You can have a sheet similar to the sample shown in Figure 1 on which to record the number of cases of the target diseases which come to your health centre. Each time you diagnose a case of one of the target diseases, place a tally mark in the appropriate column. Each tally mark ("1") represents one case of the disease. For instance, the tally sheet in Figure 1 indicates that there were two cases of pertussis in unvaccinated persons, not eleven cases.

TALLY SHEET

Month: March Year: 1986

Diseases	Vaccinated	Unvaccinated	Vaccination Status Unknown	Total
Measles	/	𝍸 //		
Pertussis		//		
Diphtheria				
Neonatal Tetanus				
Other Tetanus		/		
Poliomyelitis (acute)		/		
Tuberculosis (childhood)				

Figure 1

2.1.2 ACTIVE SURVEILLANCE

However, good your routine reporting system there will still be cases which will not be recorded as many children with mild or moderate degree of the disease may not seek treatment. Others may go to private practioners. Some of the children may be taken directly to the big towns for specialized treatment. Some of the children may die quickly after symptoms appear without being taken to a health centre. This is particularly true of neonatal tetanus.

As the number of cases decrease due to immunization coverage you must start active case finding in the community (active surveillance). This is to make sure that if any case occurs in your area you would get to know of it quickly and can then decide what action you would like to take.

You can get useful information from your health workers in the field, from other grassroot level workers such as dais, anganwadi workers, village health guides and also members of the community. Many of the diseases have characteristic symptoms and can be relatively easily recognized.

You would initially be interested in the active surveillance for neonatal tetanus and poliomyelitis. These diseases could be "indicators" of the quality of your programme. Reduction in the number of cases of neonatal tetanus would reflect an effective immunization coverage of pregnant women and poliomyelitis - of the infants.

You must encourage the health workers to come to you if any case comes to their notice. You should examine the case to confirm diagnosis and discuss with the health workers what could have gone wrong in implementation and take necessary steps so that this does not happen again. Remember you are collecting information to improve your programme. Do not punish the health workers or they will not come to you. You should encourage the health workers by providing them feedback periodically of the disease free areas.

The lay public may be educated to inform of any neonatal death (within 4 weeks of birth) following convulsions and of any child below the age of 5 years with weakness in the limbs following fever.

During your field visits enquire from the village leaders such as school teachers, if there was any recent case of poliomyelitis or neonatal death.

All reported suspect cases of neonatal tetanus and poliomyelitis must be investigated by a medical officer within 2 days to confirm diagnosis.

2.1.3 SENTINEL SURVEILLANCE

A sentinel surveillance system is developed to obtain more reliable and extensive disease information than is available from the routine reporting centres. A hospital, health centre, laboratory, or a rehabilitation centre which attend to a relatively large number of cases of the disease can be considered as sentinel centres. A sentinel centre may provide you with information on one or more diseases.

Since these sentinel centres are carefully selected and because the number of reporting units is much smaller it is easier to maintain quality and regularity of the reports.

There should be a close liaison between the sentinel centres and the local health office. Follow up action on the reports, when indicated, should be immediate. The sentinel centres provide you useful information and also serve as effective "watch-dogs or sentinels" for you. You will get an early warning if things go wrong in your area.

The sentinel centres serve only a part of the population. Therefore the information you receive from these centres will not include all the cases that occur in your area. But if you have made a careful selection of your centre it should include majority of the cases that occur and will provide you with reliable trends in the incidence of the diseases.

You can study the trends in the incidence by analysing the reports for the previous few years from the sentinel centres. Such reports would be also be useful in future in documenting the impact of your services. A proforma for collecting such information is given in the Annexures.

The district hospitals and pediatric departments of the medical colleges must serve as sentinel centres in the districts under UIP. Reports from sentinel centres should include information on age and vaccination status of each case. A proforma for the sentinel centres is given in the Annexures.

2.1.4 DISEASE SURVEYS

Surveys give reliable epidemiological information. Surveys are however difficult to conduct and are relatively expensive. The sample size, methodologies, questionaires and forms must be well designed to avoid bias and misinterpretation of data. The results of the surveys are time specific that is they relate to the period for which the surveys were conducted.

Sample surveys were conducted in 1981 and 1982 on neonatal tetanus and poliomyelitis. The statewise rates for the rural and urban areas are given in the Annexures. Methodologies for conducting disease surveys except lameness surveys, are not mentioned in this module as these are not recommended as a routine activity.

2.1.4.1 LAMENESS SURVEYS FOR POLIOMYELITIS

One of the vaccine preventable disease which leaves a sequelae which is easily identifiable even by lay people, is poliomyelitis. By collecting information on the lame children over the years you can get useful material to evaluate your programme. You already have baseline information on the incidence rate of poliomyelitis in your State prior to the polio vaccination services based on the large scale surveys on poliomyelitis conducted in 1981-1982.

The methodology for conducting the lameness survey is given in the module on evaluate vaccination coverage. You can conduct the lameness survey with vaccination survey or conduct it independently. The total number of children under 5 years surveyed should be at least 10,000. In each of the 30 clusters you must survey 334 children under 5 years of age. The forms used in the survey are given in the Annexures.

Information on lame children should also be collected during your field visits. Such information can be easily obtained from village leaders and schools. Further investigations are indicated if a case of polio with the onset of the diseases within the preceding two years or a case in a vaccinated child during the current year is reported.

2.1.5 OUTBREAK INVESTIGATIONS

Outbreak investigations must be carried out when the number of cases exceed the numbers during the corresponding period of the previous year (month or quarter) or there is a sudden increase in the number of cases.

The outbreak investigation form for measles is given in the Annexures. The same form can be used for investigating outbreaks of pertussis.

2.1.6 LABORATORY SURVEILLANCE

This is done by specialized laboratories and is not part of the routine surveillance system.

2.2 TYPES OF DATA TO COLLECT

You should collect the following data for each case of the target diseases:

- Disease
- Vaccination status
- Date symptoms began
- Age
- Name
- Address

If you collect all of this information for each patient, you will be able to analyze your data in order to learn the number of cases of the target diseases which are occurring in your area, where they are occurring, when they are occurring, who is getting sick, and why.

2.2.1 VACCINATION STATUS

You need to know the vaccination status of each case of the target diseases so that you can determine if children are getting the disease because they were not fully vaccinated or because they were vaccinated with ineffective vaccine.

If a person has received only part of the series of multi-dose vaccinations against pertussis, tetanus, diphtheria, or polio, he is not fully protected against the disease. On the other hand, if a child has received the complete course of the vaccine at the proper age and with potent vaccine, he should be considered as protected.

Occasionally an individual who is fully vaccinated at the correct age with potent vaccine may get the disease. This is not because something was wrong with the vaccine, but because the person's body did not respond properly to the vaccine. If only small number of cases occur in properly-vaccinated persons, you should not suspect that there is a major problem in your vaccination activities. However, if a LARGE number of cases occur in fully-vaccinated persons, you should assume that something is wrong.

"Fully vaccinated" means different for the different diseases, as shown in the following list:

Measles - one dose at or after the age of nine months.

Tuberculosis - one dose.

Diphtheria) - two doses, with an interval of at
Tetanus) least one month between doses.

Pertussis) - three doses, with an interval of at
Poliomyelitis) least one month between doses.

For example, if a case of paralytic polio occurs in a child who has had only one dose of polio vaccine, this case will be recorded as "unvaccinated".

It is important that further investigations are carried out to rule out cold chain failure at the place where the child received the vaccines. Study the procedures followed at this place carefully. Follow up some of the children vaccinated at this place recently.

2.2.2 DATE OF ONSET OF SYMPTOMS

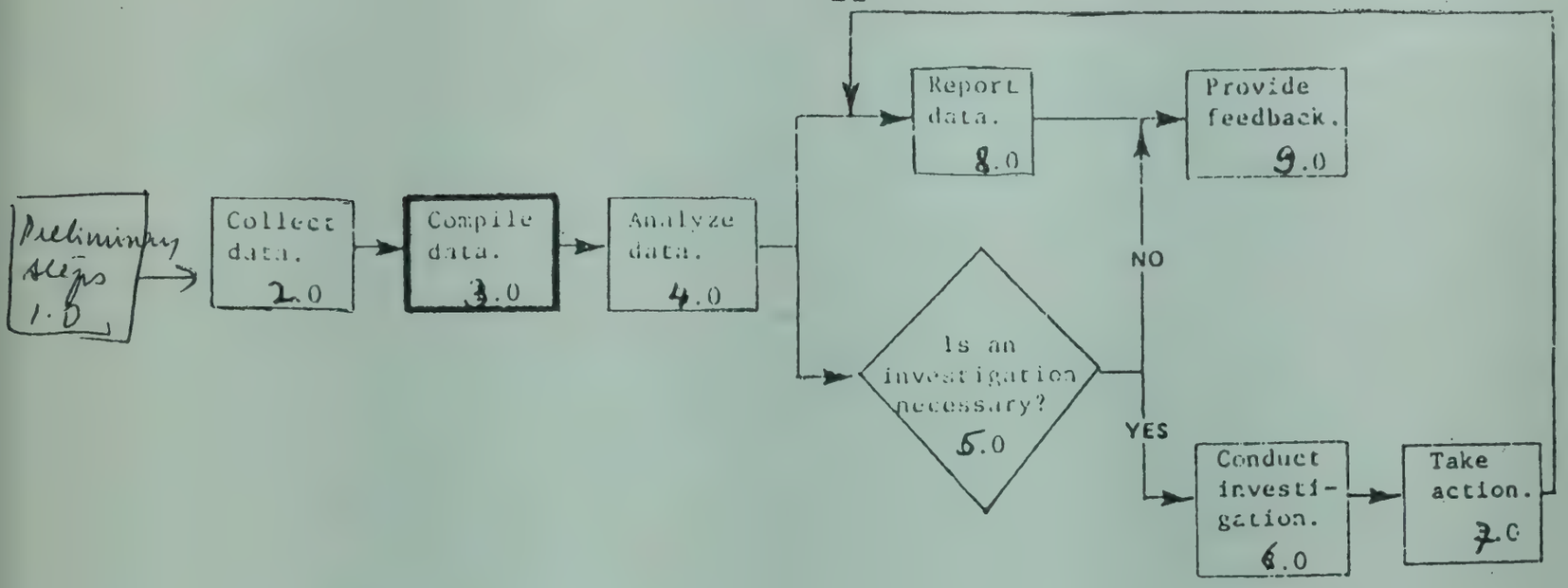
In the outpatient register or the individual patient card, record the date on which the symptoms of the disease first began so that you will know when the disease affected your area.

2.2.3 NAME AND ADDRESS

In the outpatient register or the individual patient card, record the name and address of each person who has one of the diseases so you will know exactly where the disease is occurring in your area. A child will be considered a resident if he has been in the area for 6 months or more.

2.2.4 AGE

It is very important to record the age of the child. In the initial stages of the programme it will identify the high risk age group who should be vaccinated on a priority basis. Later a shifting age pattern towards the older children is an early indication of the success of the programme. You would, however, need to analyse your data carefully.



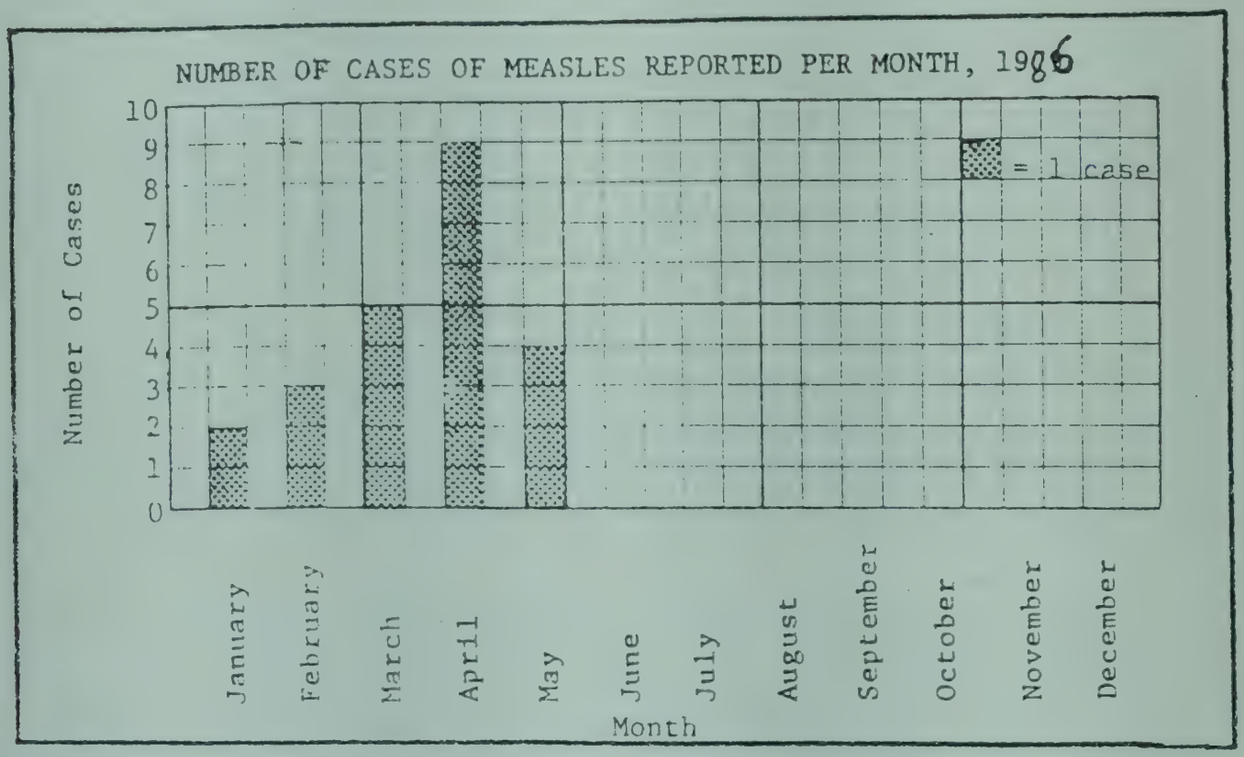
3.0 COMPILE DATA

Since it is your responsibility to reduce the number of cases of the target diseases in your area, you need to know how many cases are occurring, and where they are occurring.

In order to monitor the incidence (number of new cases in a defined population during a specified period of time) of the diseases in your area, you should maintain charts and graphs which show the number of cases of the diseases for each reporting period. It will be especially useful to keep charts and graphs for measles and pertussis since these are the diseases that occur most often. If your immunization programme is effective, it will have a dramatic impact on preventing measles and pertussis, and you can show this on your charts and graphs.

3.1 DISEASE CHARTS

Figure 2 is a sample chart for the number of cases of measles reported per month at a health centre in 1986. The chart is filled in for January through May.



By looking at this chart, it is easy to determine how many cases of measles were recorded at this health centre each month. For example, according to this chart, 2 cases of measles were reported in January, and 9 were reported in April.

3.1.1 On the first day of each reporting period, count the number of cases of the disease which were diagnosed at your centre during the previous reporting period.

3.1.2 In the space for the previous reporting period on your chart, draw a bar representing the number of cases diagnosed.

3.2 DISEASE GRAPHS

You may wish to make line graph rather than a chart. Figure 3 is a sample graph for the same number of cases of measles reported per month in 1986 as in Figure 2.

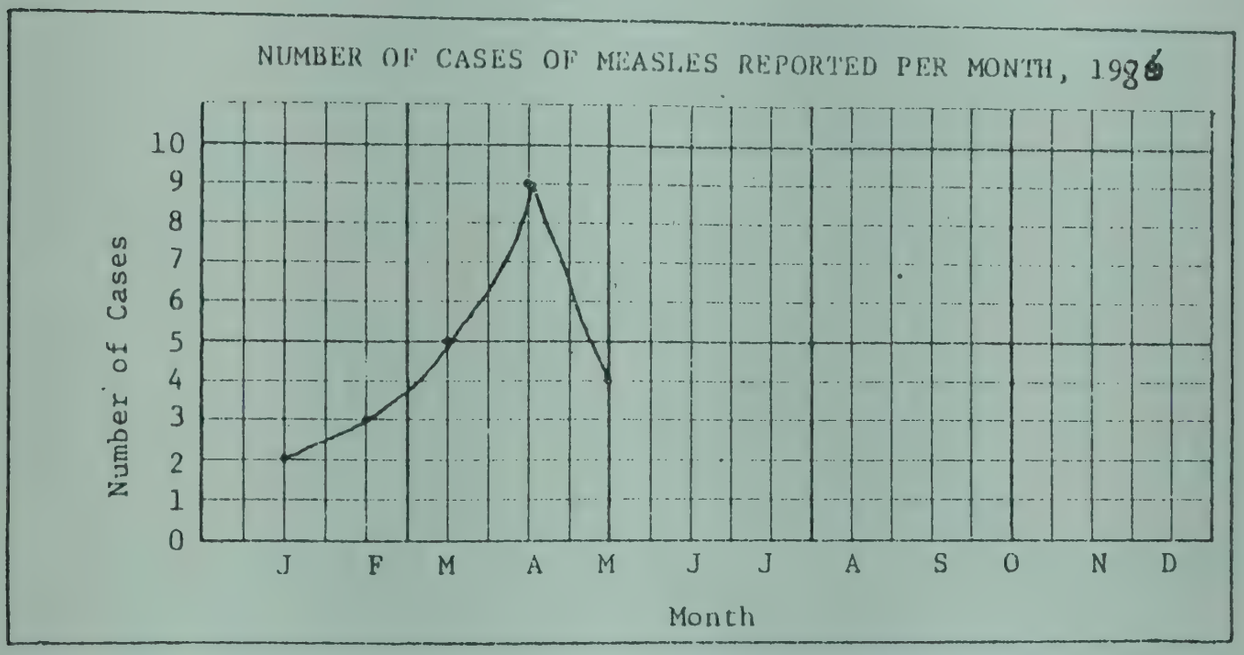


Figure 3.

As with a disease chart, it is easy to determine the number of cases of measles which occurred each month by looking at the graph.

In order to maintain a disease graph, perform the following tasks:

3.2.1 On the first day of each reporting period, count the number of cases of the disease which were diagnosed at your centre during the previous reporting period.

3.2.2 Place a dot on the graph directly above the mark for that reporting period and directly across from the number of cases diagnosed.

3.2.3 Draw a line from the previous dot to the new one, so that you will have a clear picture of the trend in the incidence of disease. If the line goes down from left to right, the number of cases is decreasing; if the line goes up from left to right, the number of cases is increasing. For example, according to the graph on page 23 (Figure 3), you can see the number of cases reported in March was 5, and in April 9, so from March to April there was an increase in the incidence of measles. From April to May, however, the number of cases reported dropped from 9 to 4, so there was a decrease in the incidence of measles.

3.3 MAPS

You will need a map of the area served by your health centre and population data for the area. This map will help you know the exact area for which your health centre must provide services and the geography of the area. You may use the map to monitor the locations of cases of the target diseases. You may monitor the locations of cases of all the target diseases or of only some of the target diseases, such as polio, neonatal tetanus, measles and pertussis.

In order to monitor the locations of cases of the target diseases, perform the following tasks:

3.3.1 Place pins or draw dots on the map to indicate the villages where cases of the target diseases are recorded.

* If you are monitoring locations of cases of more than one of the target diseases, use coloured pins or dots, with each colour representing a different disease. For example, you could use red for measles, blue for pertussis, yellow for polio, etc. You can use one pin or one dot to represent one case of the disease.

* *If the number of cases of a disease reported in your area is usually very large, you may use a pin or dot to represent more than one case.

For example, if you use a pin or dot to represent 5 cases of pertussis, you will place a pin or dot on the map at a village only when the number of cases of pertussis reported at that village during the reporting period reaches 5 or a multiple of 5 (that is 5, 10, 15, 20, 25, etc.). Therefore, if 4 cases of pertussis are recorded in your village on 1 March, the first day of the reporting period, you will not place a pin or dot on the map because less than 5 cases have been recorded. Then, if 3 cases are recorded on 2 March, the number of cases during the reporting period will be 7, so you will place a pin or dot on the map at your village. You will place a second pin or dot on your village when the number of cases of pertussis reported in the village during this reporting period reaches 10, a third pin or dot when the number of cases reported reaches 15, and so on.

✗ Remember that not all cases of the target diseases which are diagnosed and recorded at the health centre occur in the village where the health centre is located. Be sure to place the pins or dots at the villages where the cases occur.

* This information will help you in your analysis of the disease situation in your area. You will not only be able to keep a count of the numbers of cases that occur, but you will be able to tell exactly where they are occurring by just looking at the map. The map will also help you in determining how serious the disease situation is in the villages in your area. For example, if your map shows that during the previous month 20 cases of measles were reported in each of 2 villages, one with a population of 6 000 and one with a population of 500, you could easily see that the smaller village has a much more serious problem than the larger village.

3.3.2 On the first day of each reporting period, record in a note book the number of cases that occurred at each village during the previous reporting period.

By keeping this kind of data for your area, you will be able to analyze the disease situation in your area better than if you do not monitor the locations of the cases of the target diseases.

3.3.3 After you have recorded the number of cases of the target diseases in each village, remove all the pins from the map.

Exercise A

Instructions: The following are data about the number of cases of measles reported in one health centre from January through April. Use the data to do steps 1 and 2 on page 28. When you have completed this exercise, do Exercise B.

The number of cases of measles counted in the health centre for the first three months of the year were as follows:

January	35
February	23
March	28

Figure 4 is the tally sheet of the number of measles cases diagnosed in this health centre during April.

NUMBER OF MEASLES CASES: APRIL

2/4	3/4	4/4	5/4	6/4	7/4
II	0	I	I	I	0
9/4	10/4	11/4	12/4	13/4	14/4
III	0	I	I	II	0
16/4	17/4	18/4	19/4	20/4	21/4
I	0	II	0	II	I
23/4	24/4	25/4	26/4	27/4	28/4
I	II	II	0	I	0
30/4					
I					

Total number of cases: _____

Figure 4

1. Determine the total number of cases diagnosed during April and write the answer in the space in the bottom right-hand corner of the tally sheet.

2. Prepare a chart or graph showing the number of cases of measles reported per month from January through April. Use the worksheet provided on page 29 to do your work.

Worksheet for Exercise A

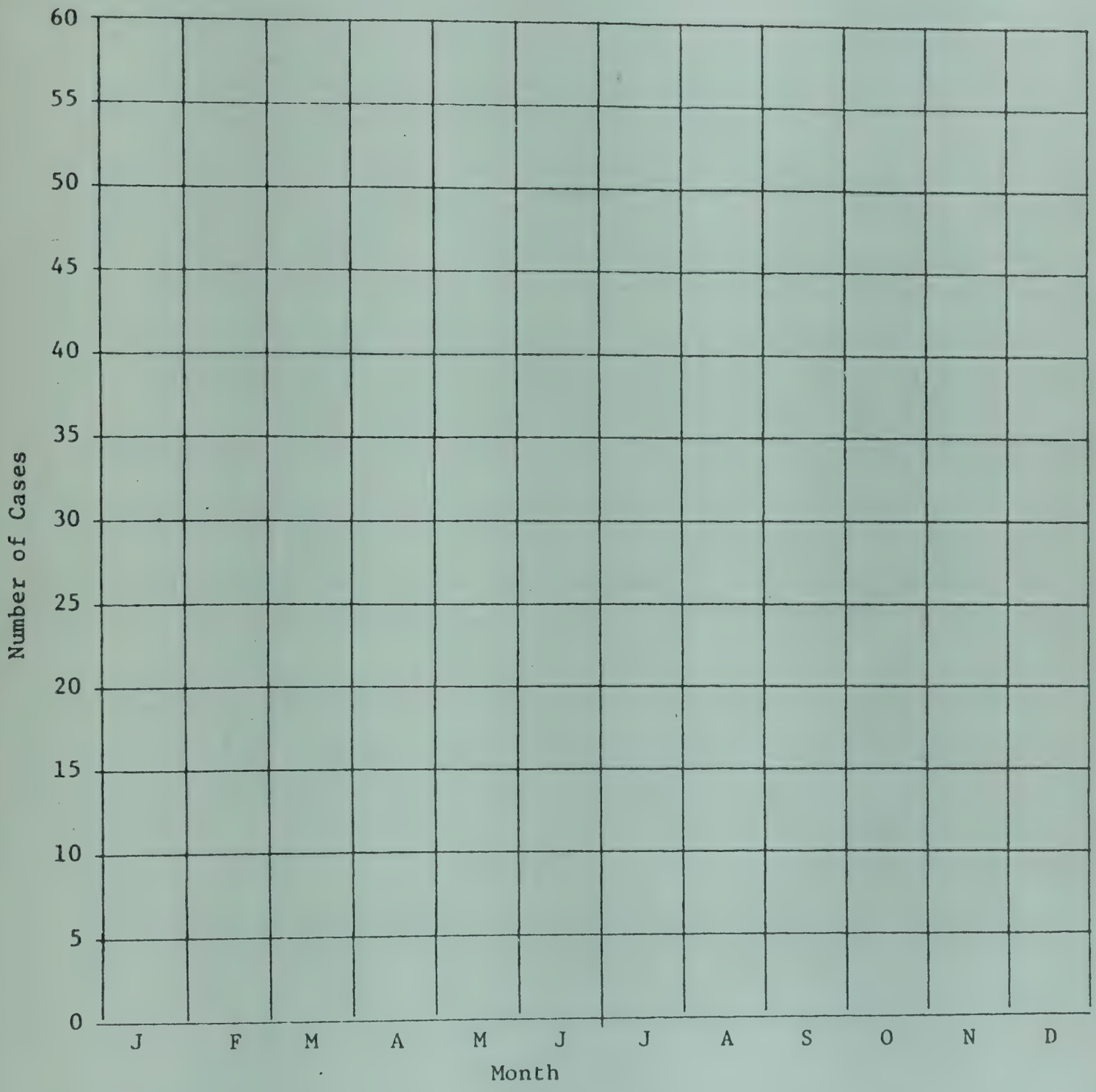


Figure 5

Exercise B

Instructions: Figure 6 on page 31 is a map of the area served by the health centre at Village A. On pages 32 & 33 is a list of the cases of measles and pertussis recorded at the health centre during March 1986. This list was taken from the out-patient register at the health centre. Use the map and the list to do steps 1 and 2 below.

1. Using "X" to represent one case of measles and "0" to represent one case of pertussis, draw in dots on the map of the area served by the Village A health centre indicating the locations of the cases of measles and pertussis in the area during March of 1986.

2. Answer the following questions in the space provided:

   # Do you think there were any cases of measles or pertussis in Villages F and G during March?

   # If you think there were no cases, why were there none?

   # If you think there were cases, why were they not reported?

When you have completed this exercise, discuss your answers to both Exercises A and B with a course manager.

AREA SERVED
BY VILLAGE A
HEALTH CENTRE

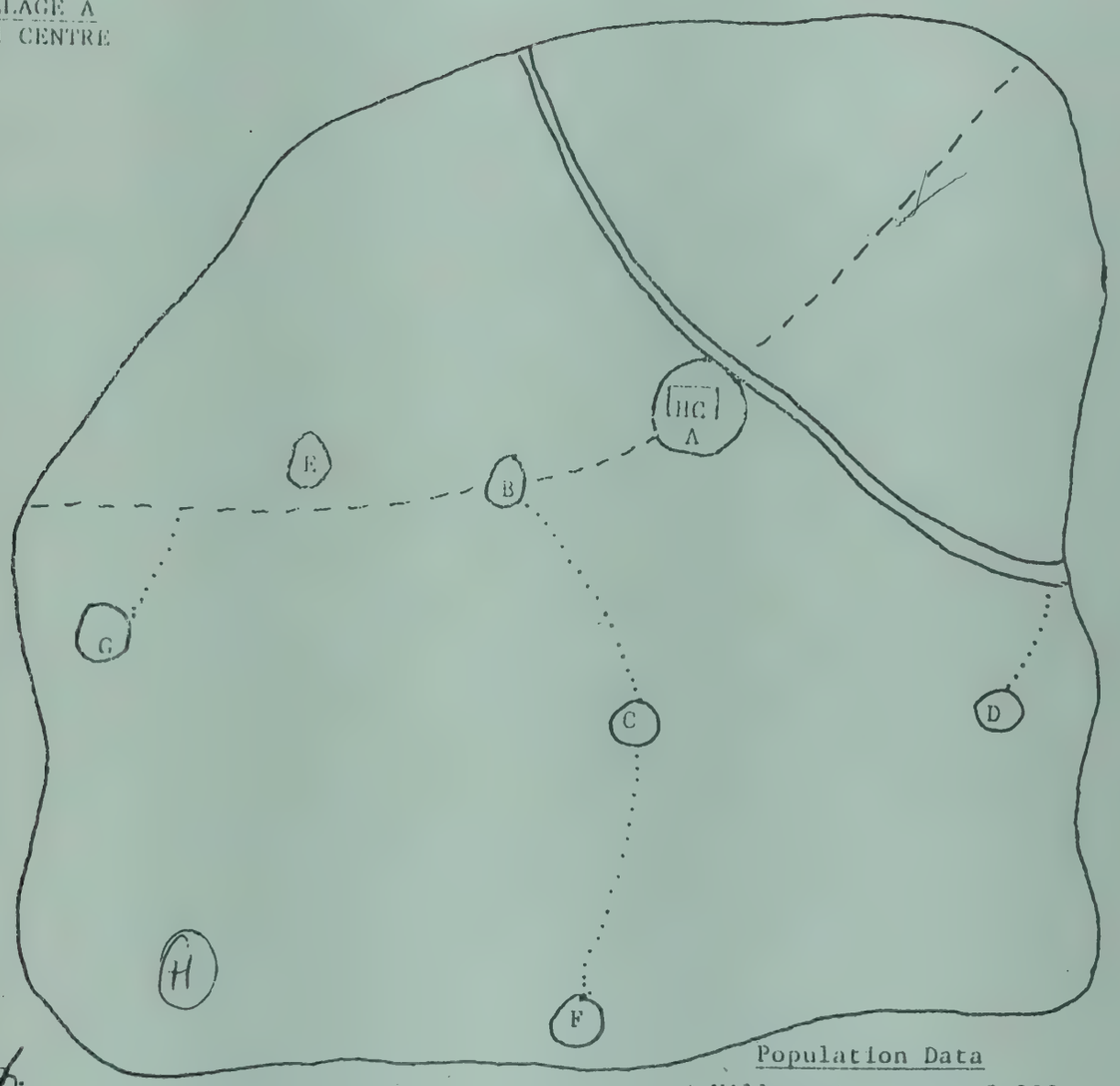


Figure 6.

major highway
all weather roads
foot path
village
HC Health Centre
5KM

Population Data

Village A	5,000
Village B	2,500
Village C	1,500
Village D	600
Village E	700
Village F	500
Village G	800
~~Village Population~~ H	5,000
Total Population	16,600

VILLAGE A HEALTH CENTRE

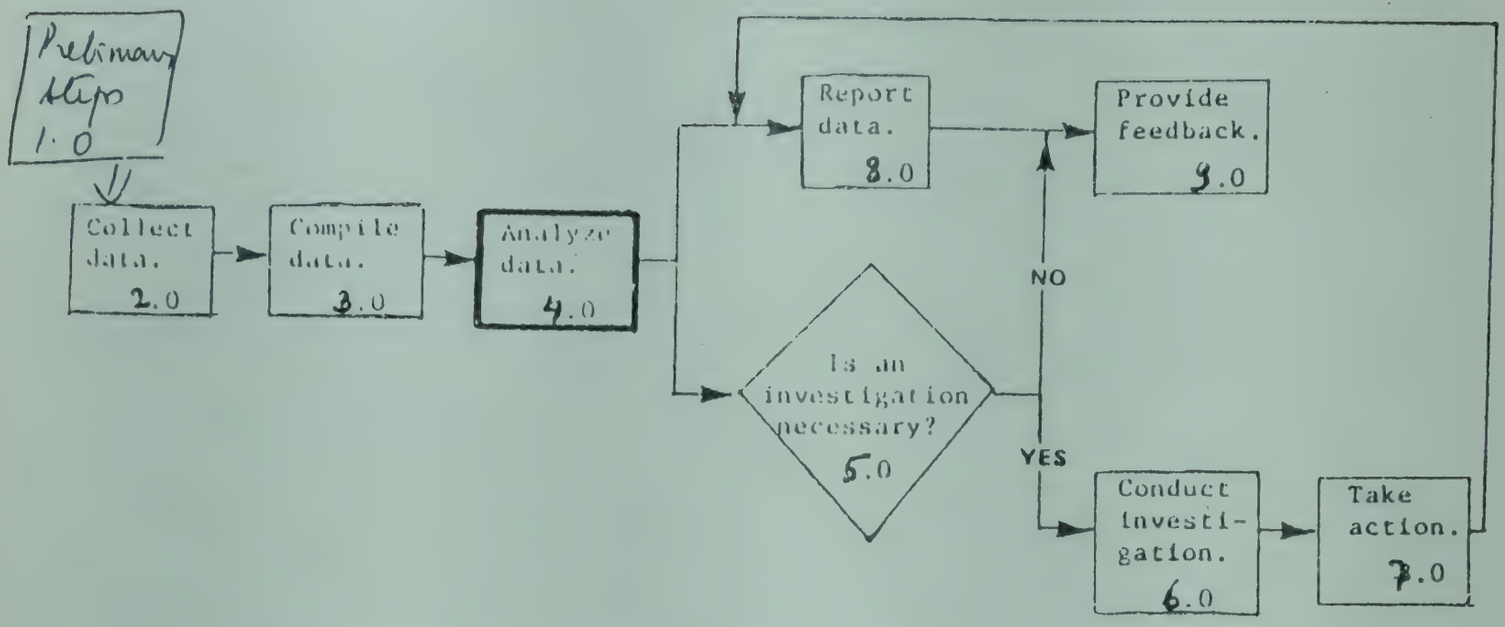
List of cases of measles and pertussis,
taken from Outpatient Register

Month: March Year: 1986

Date	Patient's Name	Patient's Address	Date of Birth	Diagnosis	Vaccination Status
1/3	Ramu ~~Balla Ba~~	Village A	2/3/85	measles	Unvaccinated
2/3	Lila ~~Abu Idris~~	Near market, Village A	5/4/85	pertussis	Unvaccinated
5/3	Gorund ~~Peter Tawai~~	Village C	17/1/85	measles	Unvaccinated
5/3	Ragu ~~Fetuma Braun~~	Village D	21/7/85	pertussis	Unvaccinated
7/3	Uma ~~Muh Mustapha~~	Village A	3/12/84	measles	Unvaccinated
9/3	Suresh ~~Nura Kemeh~~	Main road, Village B	13/6/85	pertussis	Unvaccinated
13/3	Rupa ~~Abdullah Shadras~~	Near market, Village A	26/2/83	measles	Unvaccinated
13/3	Hema ~~Biju Ruat~~	Near river, Village B	14/5/85	pertussis	Vaccinated
14/3	Balu ~~Joshua Famuina~~	Village C	16/2/85	measles	Vaccinated
15/3	Rahim ~~Ruth Lasiso~~	Near store, Village A	30/1/84	measles	Unvaccinated
16/3	Babi ~~Ari Teru~~	Near store, Village A	10/2/86	measles	Vaccinated
16/3	Rona ~~Lolu Sadago~~	Village E	31/12/84	measles	Unvaccinated
19/3	Lakshman ~~Andrew Leke~~	Village B	11/9/82	measles	Unvaccinated
19/3	Rani ~~Maum Lili~~	Near market, Village A	1/7/85	pertussis	Vaccinated
22/3	Rahul ~~Alan Taru~~	Village D	9/6/84	measles	Unvaccinated
23/3	Babu ~~Bali Kestapa~~	Village A	22/5/83	measles	Unvaccinated
26/3	Babli ~~George Changei~~	Near store, Village A	8/7/85	pertussis	Unvaccinated
26/3	Kumar	Village C	16/12/84	measles	Unvaccinated

--continued

Date	Patient's Name	Patient's Address	Date of Birth	Diagnosis	Vaccination Status
27/3	Dauda ~~Taure Kurai~~	Near market, Village B	8/1/85	pertussis	Vaccinated
27/3	Kalima ~~Joseph Turan~~	Village C	21/3/85	measles	Unvaccinated
27/3	Ashok ~~Malah Mbaye~~	~~Atumono Road~~, Village A	23/1/84	measles	Unvaccinated
28/3	Leela ~~Obanu Kone~~	Main road, Village B	17/1/85	measles	Unvaccinated
30/3	Sonia ~~Okol Assam~~	Village C	15/7/85	pertussis	Unvaccinated
30/3	Suman ~~Kioki Daru~~	Near market, Village A	20/9/84	pertussis	Unvaccinated



4.0 ANALYSE DATA

After you have compiled the data from the most recent reporting period, analyze it. Compare the number of cases with the numbers reported during previous reporting periods and with the same reporting period of previous years. Are the number higher, lower, or about the same? Whatever the answer, you have not completed your analysis until you have explained the most probable reason for it.

Five factors which influence the number of cases of a disease which will be reported are:

* the completeness of reporting
* the vaccination coverage
* the age at vaccination
* the seasonal variation
* the epidemic pattern.

4.1 COMPLETENESS OF REPORTING

Changes in the number of reported cases can be caused by real changes in the incidence of disease or by changes in the way that cases are being reported. Two major changes in reporting will be caused by changes in the number of people coming to the health centre and changes in the skill and interest of the medical officers in diagnosing and recording the cases they see. If neither of these have changed since previous reporting periods, you can be more confident that comparing the reported cases with those of past periods will tell you what is actually happening to the diseases.

When you start an immunization programme, this may encourage more people to come to the health centre, and you may at the same time be increasing the interest and skills of the health staff. So, early in your programme you may report an INCREASE in cases, and this may be a sign of improvement!

4.2 VACCINATION COVERAGE

After immunization activities have been started or increased, the number of cases of the target diseases should decrease. For instance, if you succeed in immunizing 50% of your target population against measles, you will expect the number of cases of measles to be lower than it would be if no children were vaccinated. There will still be a large number of children who have not been vaccinated, however, so there may still be many cases of measles.

If all children in the target population are vaccinated at the proper age with potent vaccine, there will be very few cases of measles. There will probably still be a few cases, however, even with 100% coverage, because people will move from other areas to your area. Also, remember that about 5% of children who are fully vaccinated at the proper age with potent measles vaccine are not protected because their bodies do not respond to the vaccine.

Your surveillance data must show a decline in the number of cases as the immunization coverage increases. If this does not happen, it is your responsibility to conduct investigations to identify the problem. You will be concerned with problems which prevent children from receiving vaccines (coverage problems) and problems which which affect potency of vaccines (vaccine problems). These problems have been discussed in the concerned modules. You should also check for artifacts in reporting.

4.3 AGE AT VACCINATION

The vaccines must be given at the right age in order to be effective. BCG can be given at birth and DPT and OPV vaccines can be started at 6 weeks of age. All efforts must be made to complete the full course of these vaccines before the first birthday, if not earlier. Measles vaccine is not administered before 9 months of age. It is important to administer the vaccines before the child has been exposed to the risk of infection. If the vaccinations are delayed the child may get the disease. Vaccination of children already immune through natural infection, will not decrease the load of susceptibles from the community and the vaccine efficacy under such circumstances is considerably less than optimal.

4.4 SEASONAL PATTERN

Some diseases occur in seasonal patterns. There is a season in which more cases occur than at any other time during the year. The seasonal patterns for polio, measles, and pertussis are often clear and are much more noticeable than those for tuberculosis, diphtheria, and tetanus. Poliomyelitis, for instance, usually occurs more in August to October than in winter, and measles and pertussis occur more in the spring than in any other season.

Figure 7, a chart of measles cases for a one-year period, clearly shows the variation in the number of measles cases. Notice that the maximum number of cases occurred in April and the minimum number occurred in December.

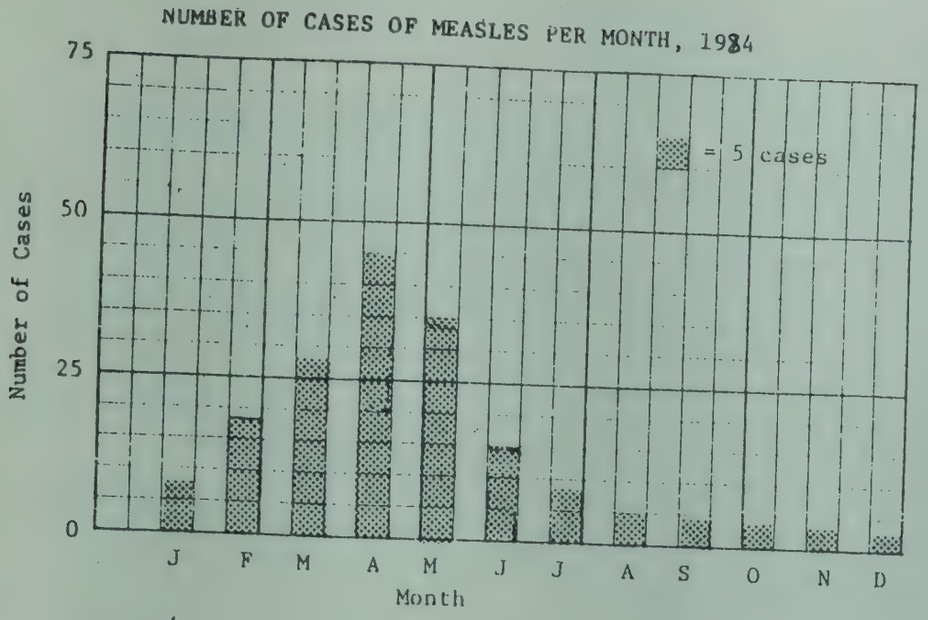


Figure 6.

Total Cases: 173

4.5 EPIDEMIC PATTERN

An "epidemic: is defined as the occurrence in a community or region of cases of the same illness clearly in excess of the usual incidence. Some diseases naturally occur in epidemic and non-epidemic years. That is, an epidemic year will occur, followed by 1, 2, 3 or more years with relatively few cases of the disease, followed by another epidemic year.

By extending the graph of measles cases to cover several years (see Figure 8 on page 44) it becomes clear that measles follows this pattern. Notice that many cases occurred in the epidemic years: 1980, 1983, 1986.

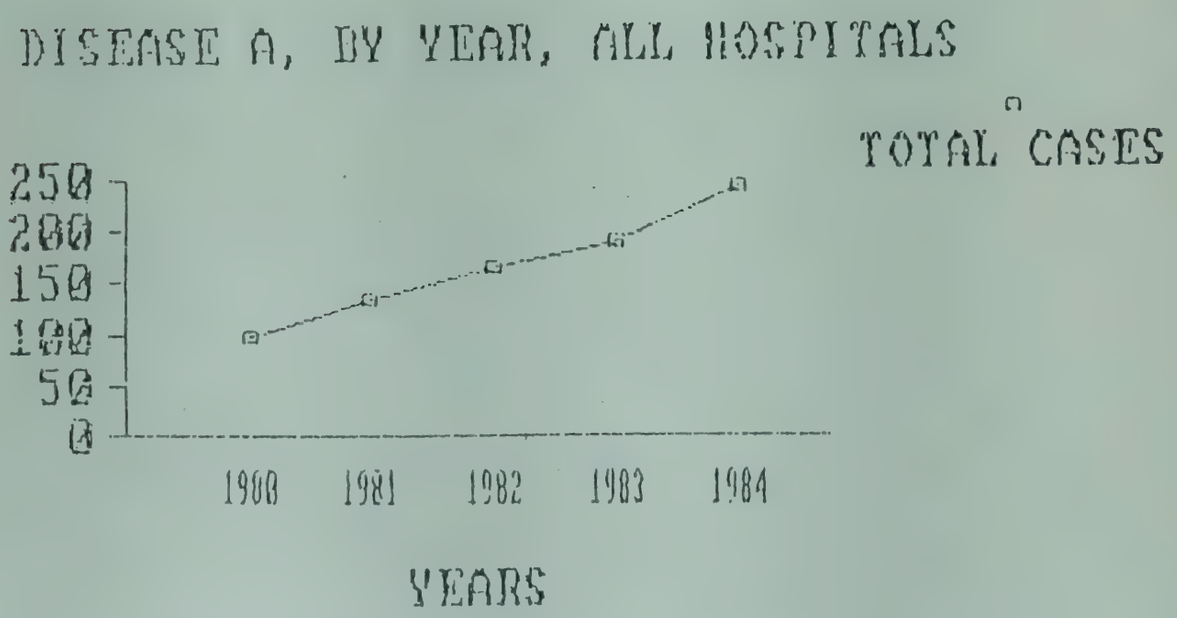
Because of these many factors which influence the number of cases which will be reported, you will need to review with care the possible reasons for increases, decreases, or lack of change in cases reported by your health centre. You can only be satisfied with your immunization programme if you know that:

- staff will recognize and report the cases they see;
- the reported number of cases is low;
- the vaccination coverage of young children and pregnant women is high; and
- the quality of the vaccine is good.

You must analyse the data thoroughly. We present here an example of misinterpretation of data, unless it is carefully analysed. Merely graphing the total number of cases reported from a selected area may not provide the true picture. The following is an example of data on "District A" from an area where 5 hospitals (Hospitals A, B, C, D & E) are reporting in 1984. If only a summary of total cases is plotted, the artifact of increased completeness of reporting sites is evident. The following data and graph illustrate this point.

INCREASED REPORTING SITES

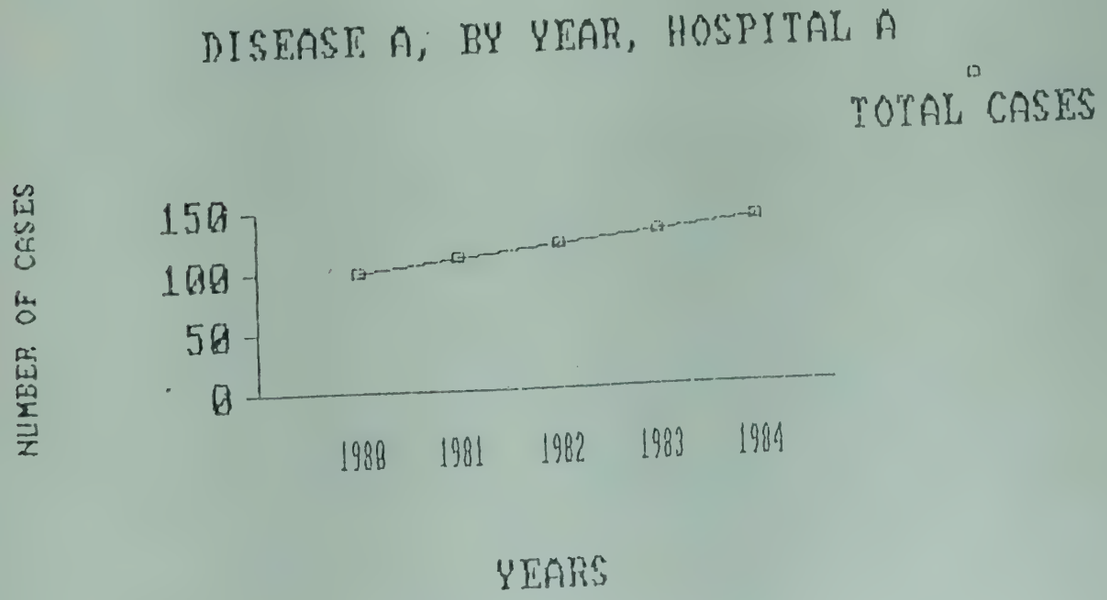
	1980	1981	1982	1983	1984
Hospital A	100	110	120	130	140
Hospital B	-	25	30	25	30
Hospital C	-	-	15	20	20
Hospital D	-	-	-	15	2 0
Hospital E	-	-	-	-	30
TOTAL CASES	100	135	165	190	240



INCREASING COMPLETENESS AT ONE REPORTING SITE

One method to overcome incompleteness of reporting from multiple sites is to chose what is known as a sentinel site -- an institution that consistently and completely reports for all cases of the diseases under study. At first glance, Hospital A in the previous example would seem to fit that criteria. But, once again, it is important to look beneath the surface of yearly compilation of reports. For example, it is possible that the hospital has not completely reported for each month of the year. Again, if only the yearly summary of total cases are plotted, the artifact of increased completeness of reporting is evident. The following data and graph illustrate this point.

	1980	1981	1982	1983	1984
January	5	-	15	10	10
February	-	10	10	15	15
March	-	25	-	15	15
April	25	-	20	-	10
May	30	-	30	15	15
June	-	30	-	10	5
July	-	10	20	-	15
August	-	-	15	20	10
September	15	-	-	20	20
October	-	20	10	10	10
November	-	-	-	-	10
December	25	15	-	15	5
TOTAL CASES	100	110	120	130	140

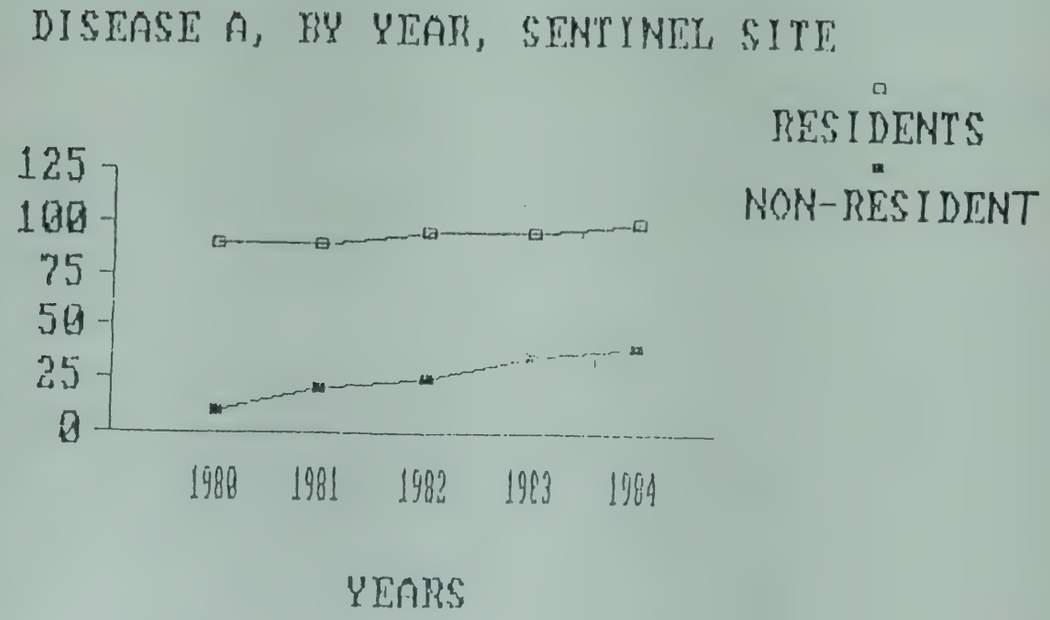


INCREASING NUMBER OF NON-RESIDENTS

Now consider the situation of a sentinel hospital that consistently and completely reports all cases of Disease A. It is still possible that data on cases of Disease A are confounded. Consider the situation where improved standards of living and transportation make it possible for increasing numbers of persons residing from outside of the normal catchment area of the hospital to now have access to the referral hospital. The number of cases of Disease A may be artificially higher due to the increasing number of non-residents. If only the yearly summary of total cases are plotted, the artifact of increasing numbers of non-residents is seen. The following data and graph demonstrate this possibility:

INCREASED NON-RESIDENTS, SENTINEL HOSPITAL

	1980	1981	1982	1983	1984
Residents	90	90	95	95	100
Non-residents	10	20	25	35	40
TOTAL CASES	100	110	120	130	140

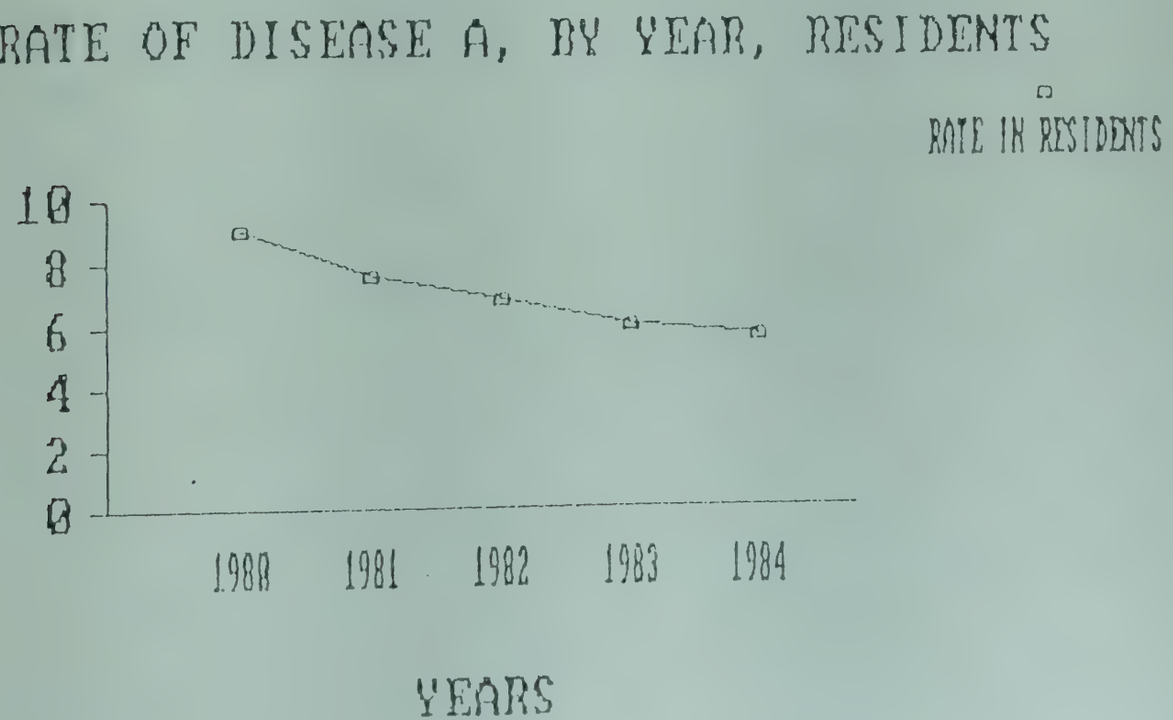


INCREASING SIZE OF POPULATION IN CATCHMENT AREA

A final consideration of possible confounding of the true trend of Disease A in the community is a changing population base in the community. This may be especially important if there is large migration of persons into the area. The best way to compensate for a changing population in the hospital's catchment area is to convert the absolute number of cases into rates. Rates take the changing population denominator into account and correct for changes in the population over time. The following data and graph illustrate this point and now it is finally possible to demonstrate an impact of the control programme for Disease A through a falling rate of incidence.

Increased Population in Catchment Area

	1980	1981	1982	1983	1984
Resident Cases	90	90	95	95	100
Catchment Popu.	10000	12000	14000	16000	18000
Rate in Residents	9	7.50	6.79	5.94	5.56



SUMMARY

The discussion from page 38 to 41 demonstrates the concept of epidemiological surveillance, the methods commonly used, the changing needs of surveillance in different stages of programme development and some of the problems in interpretation of data.

The problems of changing population can be solved by using rates rather than absolute numbers. The problems of increasing referrals from outside the usual catchment area can be solved by keeping information on the residency status of cases. The problems of completeness of reporting can be solved by utilization of sentinel sites. Further analysis may be done by analysing the age-specific incidence rates.

The important point to realize is that surveillance data require thoughtful analysis and simply adding up absolute numbers of cases reported from various institutions in the area may not give a true p icture of disease trends in the community.

Exercise C

Instructions: Refer to the graph on page 44, NUMBER OF CASES OF MEASLES REPORTED, 1980-1986 (Figure 8) in order to answer the questions below. Write your answers in the spaces provided after each question. When you have completed this exercise, do Exercise D.

1. According to the graph, what is the trend in the number of cases in the area from 1980 through 1986?

2. Does the graph indicate:

   a) A seasonal pattern? If yes, described the pattern.

   b) Epidemic and non-epidemic years? If yes, which years are the epidemic years?

   c) That the vaccination programme started in 1983 has been effective in reducing the number of cases?

NUMBER OF CASES OF MEASLES REPORTED, 1980–1986

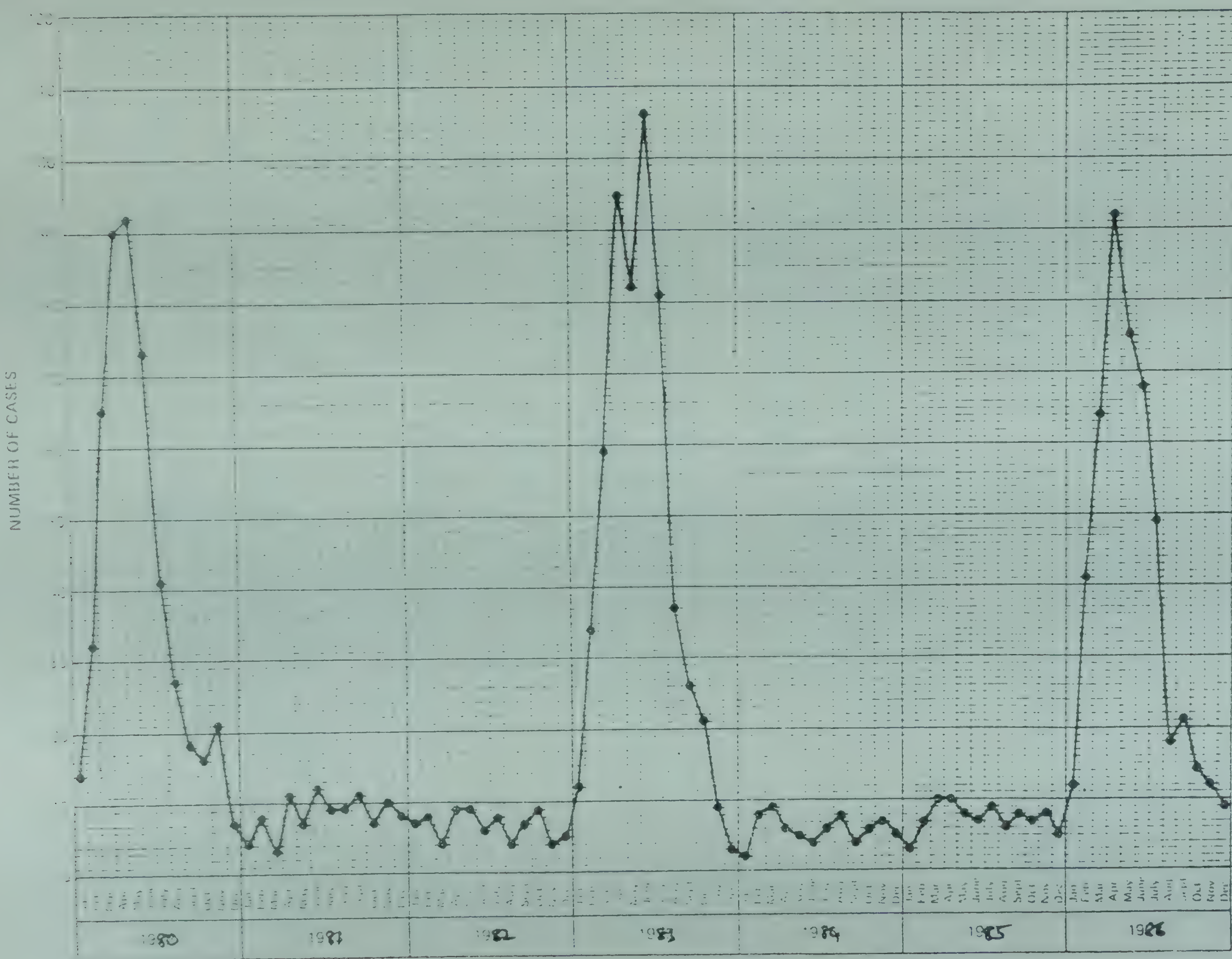


Figure 8

Exercise D

Instructions: Refer to the bar diagram in Figure 9 below and answer the question that follows it in the space provided.

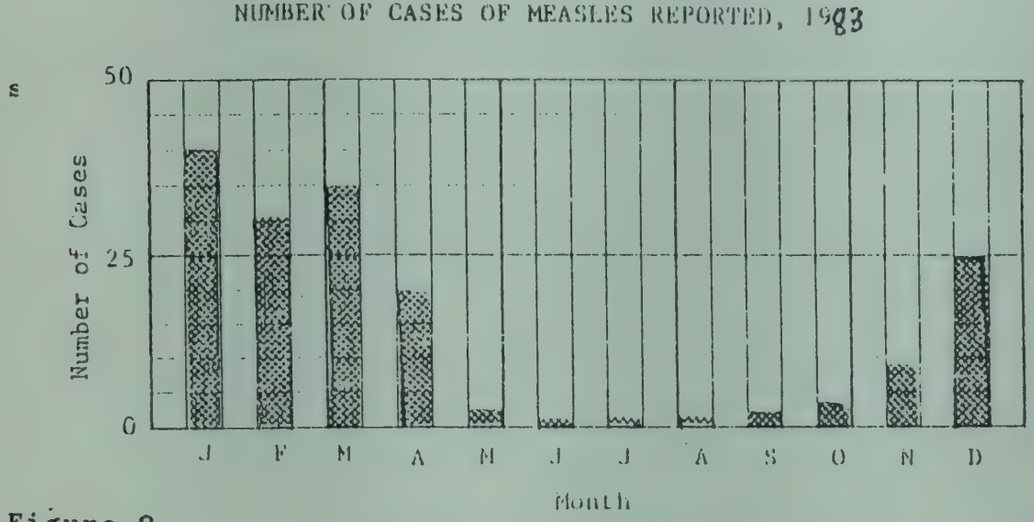


Figure 9.

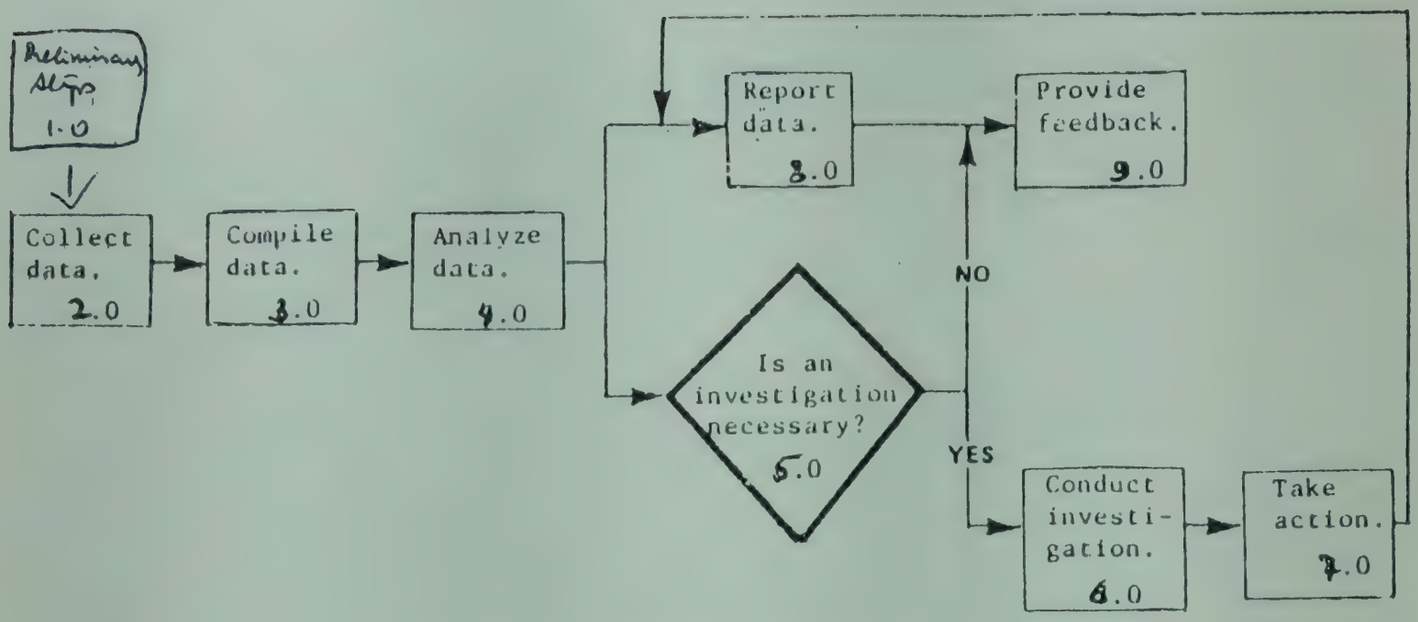
What are the possible explanations if the case count in January of 1984 is:

* 60?

* 30?

* 10?

Discuss your answers with a course manager when you have completed this exercise.



5.0 IS AN INVESTIGATION NECESSARY?

An investigation should be conducted if the surveillance data show the following:

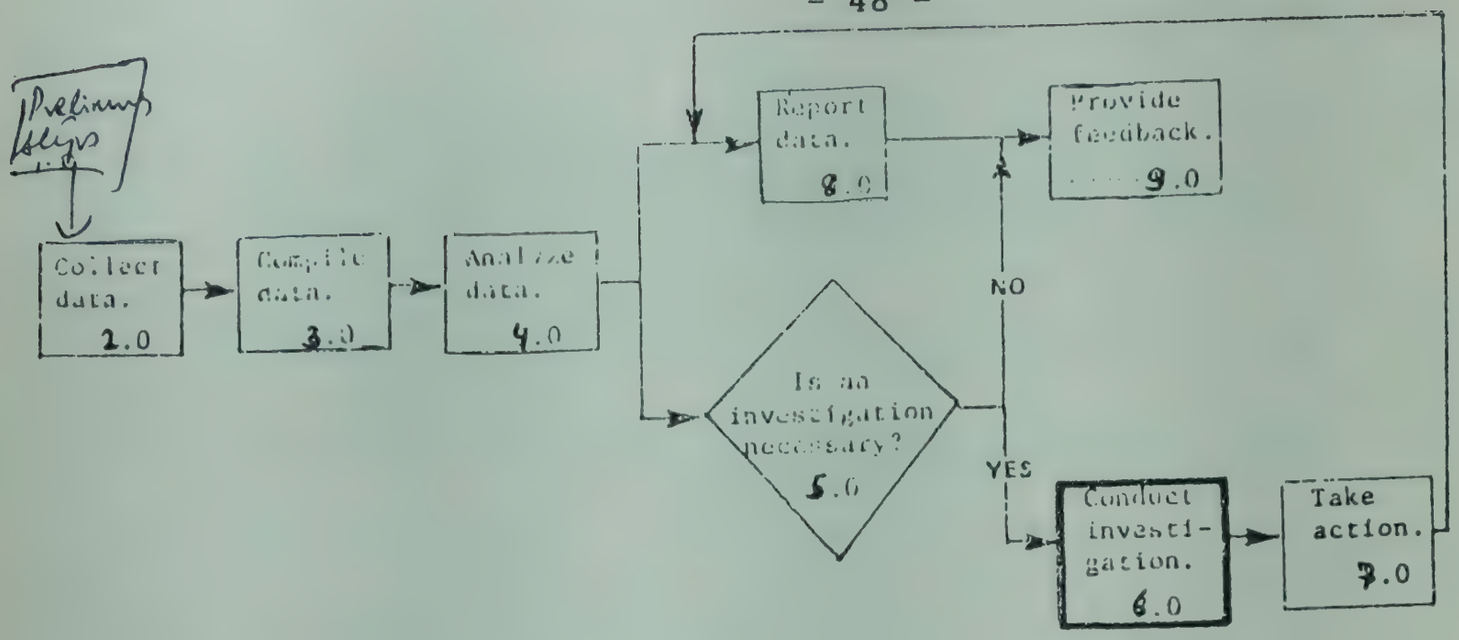
5.1 The number of cases which must occur before an investigation is necessary is not the same for all the target diseases or in all areas. Since your area is covered under UIP you should investigate even a single case of diphtheria, polio and neonatal tetanus. For measles and pertussis, investigate if there is a sudden increase in the number of cases.

5.2 Investigate **any case in a vaccinated child.** Remember that a very small percentage of children who are fully vaccinated do not respond to the vaccine, so they remain susceptible to the disease. You must, however, conduct an investigation to eliminate any chances of programme failure.

5.3 Investigate if there is a sudden decrease in numbers. There could be several reasons. We have discussed in the previous chapter artifacts for increased numbers. The reverse could also be true.

5.4 Nil reports from areas where the coverage is relatively low; and

5.5 Poor downward trend in the disease incidence in spite of improved services.



6.0 CONDUCT INVESTIGATION

Your action depends upon the reason for the investigation. There will be three major reasons for conducting an investigation:

* more cases than you expect;
* cases occurring in vaccinated children, and
* fewer cases than you expect.

6.1 MORE CASES THAN YOU EXPECT

Check the reports of the immunizations performed in the population served by the health centre. If they suggest that the immunization coverage is low, the increase in cases should not surprise you! Warn the health staff and the community of the problem and make all efforts to improve coverage.

If the immunization reports suggest high coverage, this MAY indicate a problem with the vaccine, but a visit to the area from which the cases are being reported will be necessary to be sure. During the visit, check the immunization cards of ALL the children you find to see whether coverage has been high or low.

Visit as many cases as possible and from questions and examination decide whether you think the original diagnosis was correct. Then check carefully to determine whether or not the case had been vaccinated. Count as "vaccinated cases" only those who were given the appropriate number of doses and had been vaccinated at least two weeks before they became ill, since many of the vaccines will take this long before they protect the child.

If more than 5% of the cases were fully vaccinated at least two weeks before they became ill, the vaccine used was probably not potent. This is an emergency for your programme! Contact your supervisor as quickly as you can to make a decision whether or not to continue using this vaccine.

6.2 CASES IN VACCINATED CHILDREN

First try to confirm the diagnosis of the cases and to confirm that they were vaccinated at least two weeks before they became ill. If there still seems to be a problem, visit the area(s) from which the cases are being reported. During the visit, look for all children who had the disease at about the same time as the cases who were reported. Confirm the vaccination history in each case you find. You will probably find several cases which have not been reported. If more than 5% of all the cases you find were vaccinated at least two weeks before they became ill, the vaccine used was probably not potent. This is an emergency for your programme! Contact your supervisor as quickly as you can to make a decision whether or not to continue using this vaccine. Review your cold chain system and take necessary action to eliminate any chances of a break in the cold chain. This is discussed in detail in the module 'Manage the Cold Chain System'.

6.3 FEWER CASES THAN YOU EXPECT

The vaccine preventable diseases are widespread in unimmunized communities. It has been estimated by WHO that 80% of the children will get pertussis, 90% measles and 5-10/1000 paralytic poliomyelitis in the unimmunized areas. Sample surveys conducted in 1981 and 1982 showed that on an average the neonatal tetanus mortality rate was 13.3/per 1000 live births in rural areas and 3.2/1000 in the urban areas in India. The polio incidence rates were 1.6 per 1000 children 0 to 4 years in the urban areas and 1.7 per 1000 in the rural areas.

Vaccines are effective only if the full course of the potent vaccine is given at the right age.

The efficacy of OPV, pertussis and BCG vaccines is said to be around 85% and of diphtheria toxoid, tetanus toxoid and measles - 95%.

The efficacy of vaccines is calculated as follows:

$$\text{Vaccine Efficacy} = \frac{\text{Attack rate in unvaccinated} - \text{Attack rate in vaccinated}}{\text{Attack rate in unvaccinated}} \times 100$$

You must be aware of the expected number of cases in your area. This will depend on the immunization coverage achieved by you. The actual number of cases, except for tetanus, may be slightly less than your estimate if the immunization coverage is 50% or more due to herd immunity.

Exercise E

Questions 1-4 deal with findings of investigations. For these questions you are given information about the number of cases of diseases reported at various health centres, vaccination coverage, and other factors. The information may be incomplete, but based on the information provided, decide what action you would take to correct the situation. Write your answers in the spaces provided.

1. A large number of pertussis cases is reported from communities with a vaccination coverage of 70% for one dose of DPT, 50% for two doses, and 20% for three doses. How would you investigate the problem? What would you do? _____

2. A large increase in pertussis cases is reported in a community with at least 80% coverage with three doses of DPT by the time children reach 15 months of age. Cases are occurring in vaccinated children. How would you investigate the problem? What would you do? _____

3. An increase occurs in cases of neonatal tetanus reported from one rural health post. In your investigation, you find that midwives are using properly sterilized knives for cutting the umbilical cord,

but that cow dung is placed on the cord afterward. How would you investigate the problem? What would you do?

4. The number of reported measles cases increases greatly in a community where 80% of the children are vaccinated. Most are vaccinated at age 6 months. How would you investigate the problem? What would you do?

Discuss your answers with a course manager when you have completed this exercise.

Exercise F

Instructions: Read the following paragraph and examine the estimated rates of diseases given at page 50 and answer questions 1 through 3.

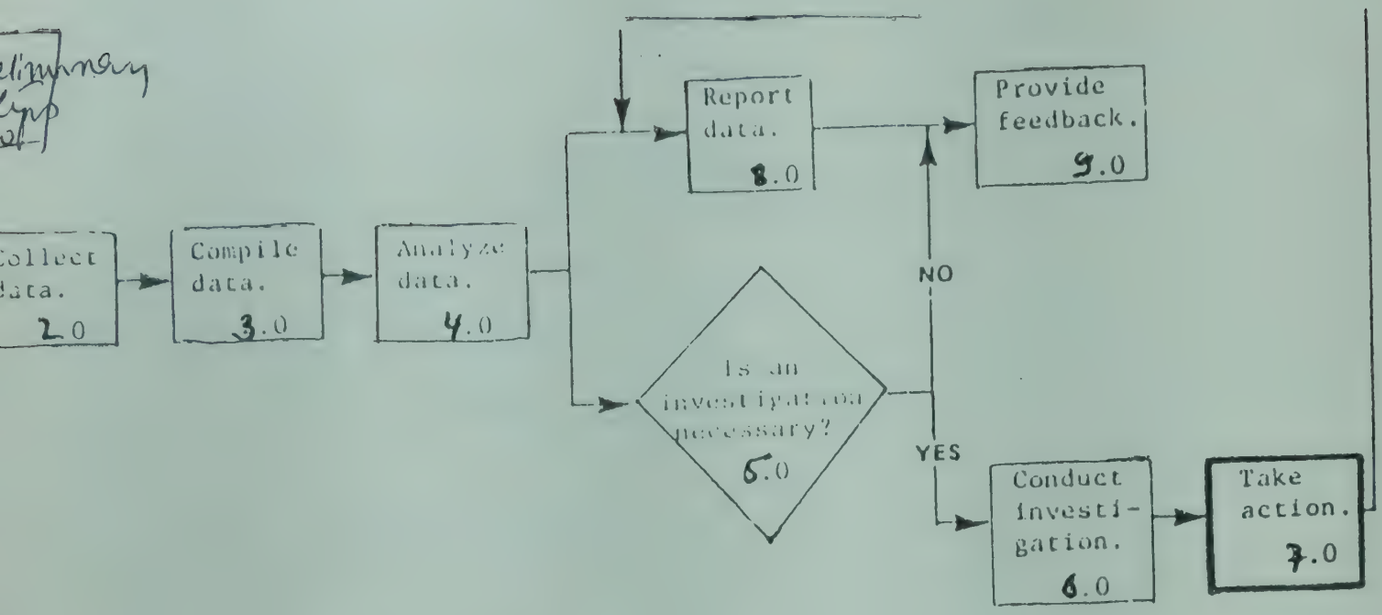
Your health centre has a population of 89,000. The birth rate is 28/1000 and IMR 95/1000 live births. The reported coverage in your health area is 40% with TT2 of pregnant women, 70% of infants with DPT 3 and OPV 3, 65% with measles. Herd immunity is not taken into account.

Question 1: How many cases of nenonatal tetanus, polio, whooping cough and measles you would expect in your area if there was no immunization programme?

Question 2 How many cases of diseases would you expect approximately assuming that the coverage given above is correct?

Question 3: What would you do to improve surveillance activities in your area?

Discuss you answers with a course manager when you have completed this exercise.



7.0 TAKE ACTION

The health of the people in the area served by your centre is your responsibility. Therefore, you will want to take action to correct any problem your investigation uncovers.

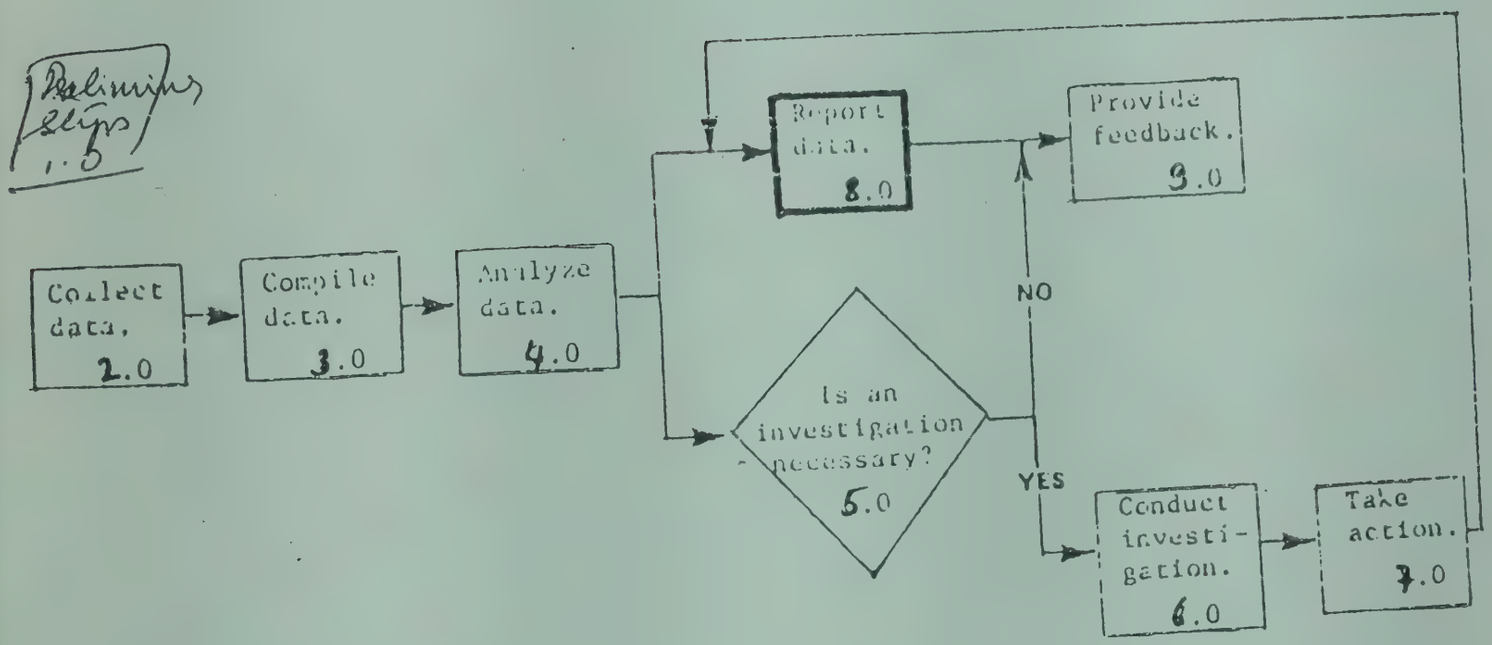
The four common causes of poor impact of the immunization programme are:

- vaccination coverage is low. Verify the coverage if high coverage is reported but cases continue to occur;

- the vaccines may be given at the wrong age to older children. The efficacy of the vaccines is high when it is given to susceptible children who are still at high risk of developing the disease.

- the technique of administration or the dosage (amount or vaccine administered) may not be correct; and

- break in the cold chain.



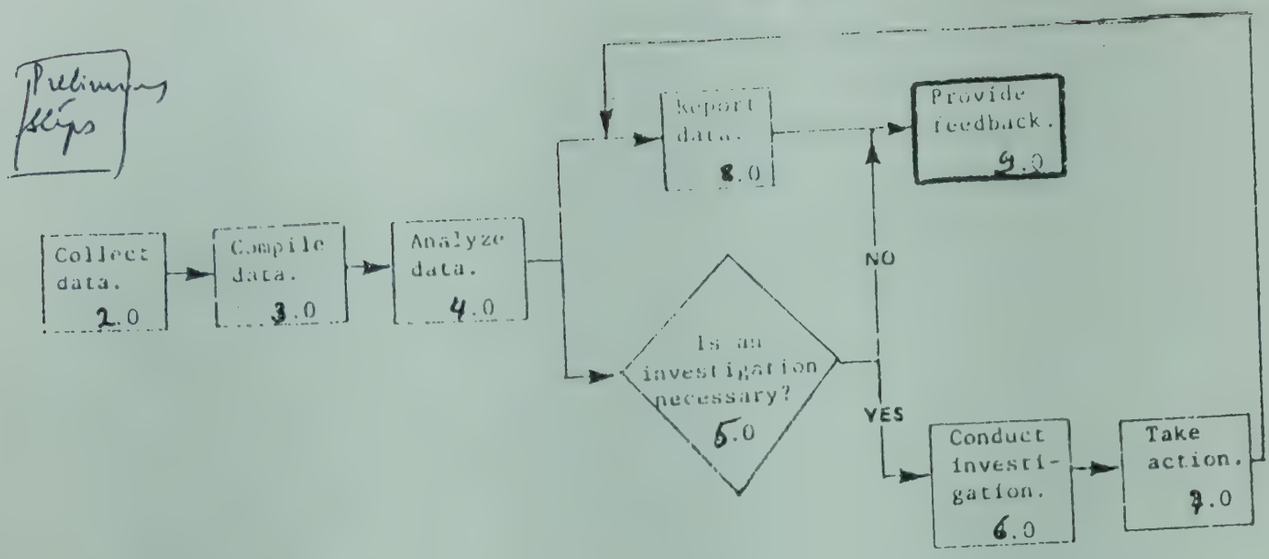
8. REPORT DATA

After you have analyzed data for the previous reporting period, prepare the regular surveillance report and send it to the district supervisor.

It is essential that the report be sent promptly after the end of each reporting period. If there is no case you must send a NIL report.

If any investigations were carried out, add a separate note.

See the monthly report form in the annexure and discuss with your course manager.



9.0 PROVIDE FEEDBACK

The term "feedback" refers to:

* commenting upon the promptness, completeness and accuracy of the surveillance reports.

* informing them of the effectiveness of the vaccination activities in meeting the disease-reduction objectives in the region.

* offering information which might be helpful to them in solving problems (for example, tell them how the staff at one sub-centre solves a common problem).

* congratulating them on doing a good job or encouraging them to do a better job.

9.1 REASONS FOR PROVIDING FEEDBACK

Providing feedback is essential to keep staff motivated to achieve high levels of immunization coverage and motivated to collect accurate and complete data on the occurrence of the target diseases.

9.2 METHODS OF PROVIDING FEEDBACK

* Use the monthly meeting to discuss the reports.

* Visit the subcentres and discuss the reports.

PART II

DISTRICT

The basic steps and responsibilities involved in conducting disease surveillance have been described. Although the disease surveillance activities conducted at the district level are similar to those conducted at the health centre level, they are not exactly the same. This part of the module will not repeat the information that has been included earlier. It will describe the tasks that the district supervisor of vaccination activities must perform in order to conduct disease surveillance.

1.0 COLLECT DATA

Data collected at the district level are used

* to decide at the district and state level whether changes in the programme are necessary.

* to decide at the national level whether changes in the programme are necessary.

* to document impact of the services.

Although the primary purpose of gathering surveillance data at the district level is for use at the district level, it is also important that data from each district be reported to the state and national office. The state and national supervisor can then analyse the data from the entire state and inform you of situations which could affect the vaccination activities in your district.

The procedures you will follow to collect and report surveillance data will be determined at the state and national level. These will include:

* which information to gather,

* how often to compile the information,

* how often to report the information, and

* which forms and format to use to report the information.

These procedures are already in use, and you are already familiar with them.

1.1 RECEIVE SURVEILLANCE REPORTS

The supervisor at each health centre in your region is responsible for the collection of surveillance data in his area. At the beginning of each reporting period, he should send you his surveillance report for the previous reporting period. The minimum amount of information you should receive from each health centre is:

* the number of cases of each of the target diseases counted during the reporting period, and

* the vaccination status of each case.

* the age of each case.

* date and place of onset.

In order to monitor the receipt of surveillance reports, you can keep a chart in your office to show the dates the reports are received. The chart might look like the sample chart on page 60 (figure 10).

When you receive a regular monthly surveillance report from a reporting unit, record the date of receipt in the appropriate column on the chart.

By maintaining this chart, you can quickly review which health centres and hospitals are reporting promptly. This can also help you to follow up and ask those units which do not report on time to submit their reports immediately.

DATES SURVEILLANCE REPORTS RECEIVED

DISTT. 'A' Year: 1986

REPORTING UNITS	Date Report Received for the Month of:											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Health Centre A	5/2	6/3	4/4	3/5	5/6	3/7	3/8	6/9	4/10	6/11	5/12	4/1
Health Centre B		13/3	9/4	6/6	6/6	5/7		10/9		9/11	13/12	16/1
Health Centre C	8/2	9/3	4/4	8/5	7/6	4/7	22/8	5/9	8/10	9/11	5/12	4/1
Health Centre D	14/2	8/3	8/6	15/5	8/6	9/7		14/9		13/11	/12	8/1
Health Centre E	6/2	6/3	11/4	10/5	5/6	6/7	7/8	10/9	15/10	9/11	6/12	7/1
Health Centre F	7/3	6/4	9/5	9/5	20/9	20/9	20/9	20/9		27/12	27/12	27/12
Hospital A	9/2	7/3	16/4	8/5	14/6	9/7	6/8	11/9	12/10	13/11	12/12	7/1

Fig 10

Your goal is to achieve regular surveillance reporting from all areas in your region so that you can monitor the effectiveness of the immunization activities. When immunization activities are first started or increased in an area or region, the surveillance reports may not completely and accurately reflect the actual number of cases for the following reasons:

* Not all cases come to a health facility.

* Not all cases are diagnosed correctly.

* Only some health facilities report.

* The health facilities that report do not report all the time.

As already stated, your primary goal is to identify centres which will give you DEPENDABLE information. Although the information collected from these sentinel reporting sites will not permit an estimate of the overall number of cases, it should give you a better indication of disease trends than will information from centres which do not report dependably.

As a beginning the district hospital should be made a sentinel centre. If there is a medical college in your district or a nearby district contact the pediatric department and establish a sentinel centre.

Circumstances under which investigations must be conducted have been discussed earlier. If you do not get a report from the concerned health centre, it is your responsibility to ensure that investiations are conducted and necessary follow up action is taken. You must provide assistance to the health centre to conduct investigations, if required.

Exercise G

Instructions: Read the following paragraphs, then examine statements on pages 63, 64. After you have examined these statements, answer questions 1 through 3, which follow the statement at page 64. Use the worksheets provided on pages 65 and 66 to do your work.

You have just been assigned as District Immunization Officer of District A. You are responsible for organizing and supervising disease control activities in your District. One of your duties is to monitor the number of cases of the target diseases which occur so that you can evaluate the effectiveness of the vaccination activities which began in the region eight years ago.

There are eight health centres and one hospital in the region. At the beginning of each month, each of these health facilities should submit a surveillance report showing the number of cases of the target diseases which occurred in its area during the previous month. On the first day of your new job at region headquarters, you decide to review the surveillance data which is available for the past three calendar years, 1984-1986. You decide to concentrate on measles.

Statements on pages 63 and 64 show the number of cases of measles reported per month by each of the health facilities from 1984 to 1986.

NUMBER OF MEASLES CASES REPORTED, REGION A

1984

	J	F	M	A	M	J	J	A	S	O	N	D
Hospital A	42	67	85	...*	...	...	...	194	75	6	8	11
Health Centre 1	23	35	38	47	49	26	13	3	5	7	11	12
Health Centre 2	17	23	...	...	8	95	...	...	70	10	...	...
Health Centre 3	7	11	...	...	...	61	...	...	4	8	...	42
Health Centre 4	5	...	14	20	...	...	42	...	0	2	5	...
Health Centre 5	12	19	25	37	32	16	9	4	3	4	7	10
Health Centre 6	42	...	...	...	...	...	...	97	...	...	...	...
Health Centre 7	8	11	17	...	32	13	18	17	21	5	4	7
Health Centre 8	...	...	...	...	...	...	...	...	...	...	234	...
TOTAL	156	166	179	104	121	211	82	315	178	42	269	82

1985

	J	F	M	A	M	J	J	A	S	O	N	D
Hospital A	27	34	58	...	...	106	12	7	6	...	9	...
Health Centre 1	15	18	24	29	32	16	8	4	0	3	5	9
Health Centre 2	...	15	...	19	...	30	7	2	1	4	7	...
Health Centre 3	...	15	17	...	...	...	25	...	6	1	...	5
Health Centre 4	7	11	...	...	...	50	...	9	...	2	2	4
Health Centre 5	11	16	16	17	18	5	8	2	0	1	2	5
Health Centre 6	27	...	...	...	...	...	...	103	...	...	...	4
Health Centre 7	...	8	11	16	15	10	...	6	0	1	1	3
Health Centre 8	5	...	...	...	...	...	156	...	...	20	...	...
TOTAL	92	117	126	81	65	217	216	133	13	32	26	30

* "..." means no report was received for the reporting period.

1986

	J	F	M	A	M	J	J	A	S	O	N	D
Hospital A	17	24	31	...	...	55	8	6	5	9	15	...
Health Centre 1	11	10	19	21	25	12	5	1	0	4	6	8
Health Centre 2	15	10	17	...	...	...	50	2	...	5	9	10
Health Centre 3	9	11	15	...	25	...	5	0	...	3	5	7
Health Centre 4	...	15	...	20	...	...	...	15	1	3	5	6
Health Centre 5	7	8	13	15	19	7	3	0	2	5	8	9
Health Centre 6	...	38	...	...	...	...	98	...	...	...	68	...
Health Centre 7	5	...	...	11	...	6	...	...	1	3	4	7
Health Centre 8	46	...	...	...	...	...	...	117	...	...	...	...
TOTAL	110	116	95	67	69	80	169	141	9	32	120	47

1. a. Prepare a disease chart or graph for the number of cases of measles reported per month in Region A from 19~~7~~ 84 through 19~~1~~ 86

   b. What pattern emerges for the region?

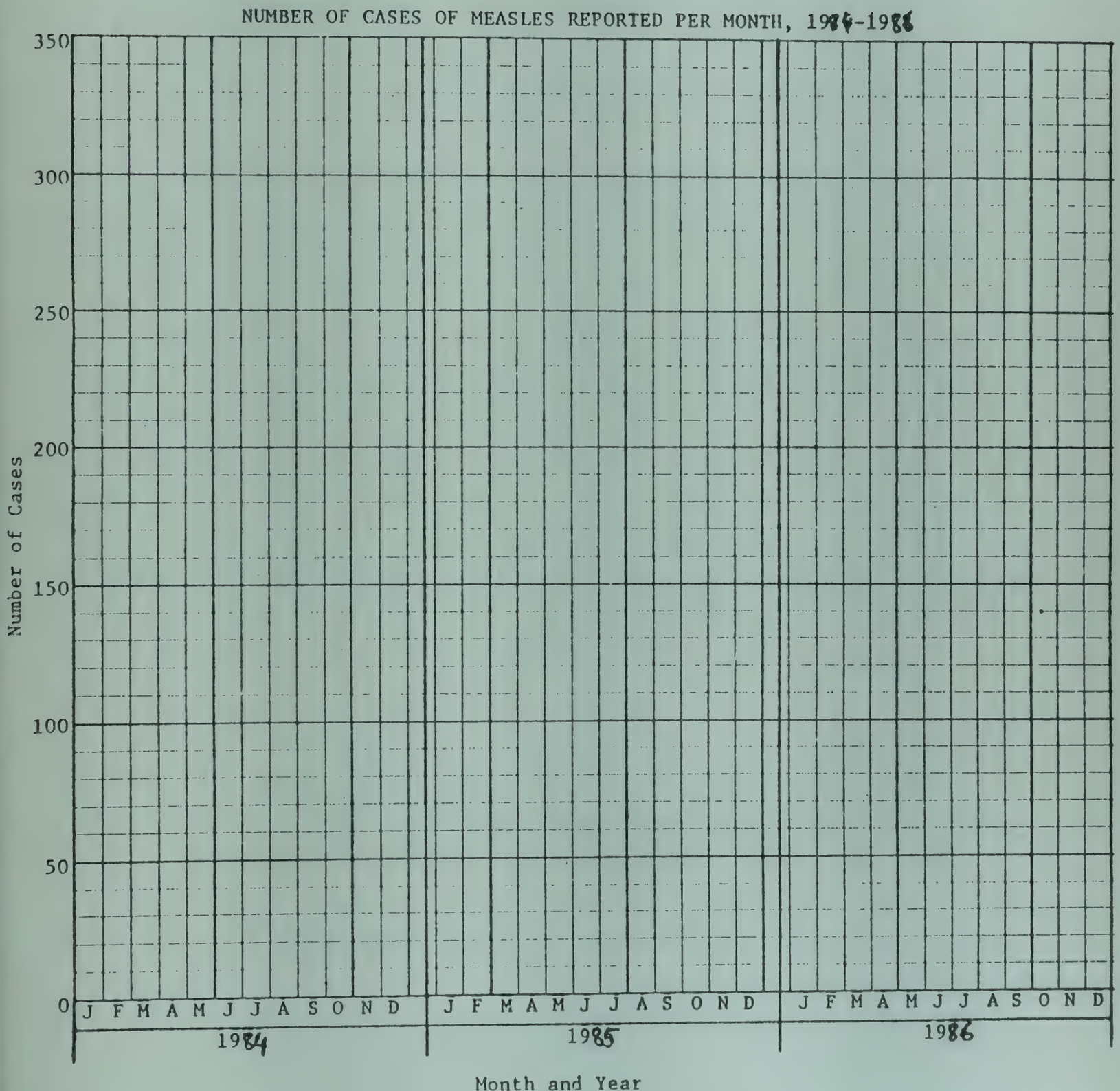
2. a. Determine which reporting units to use as sentinel sites. For this exercise, choose as sentinel sites those reporting units which have reported at least 75% of the time (i.e., those that have submitted at least 27 monthly reports during the three-year period).

   b. Prepare a disease chart or graph for the number of cases of measles reported per month by the sentinel sites in Region A from 19~~8~~ 84 through 19 86

   c. What pattern emerges for the region if you use only the reports from the sentinel sites?

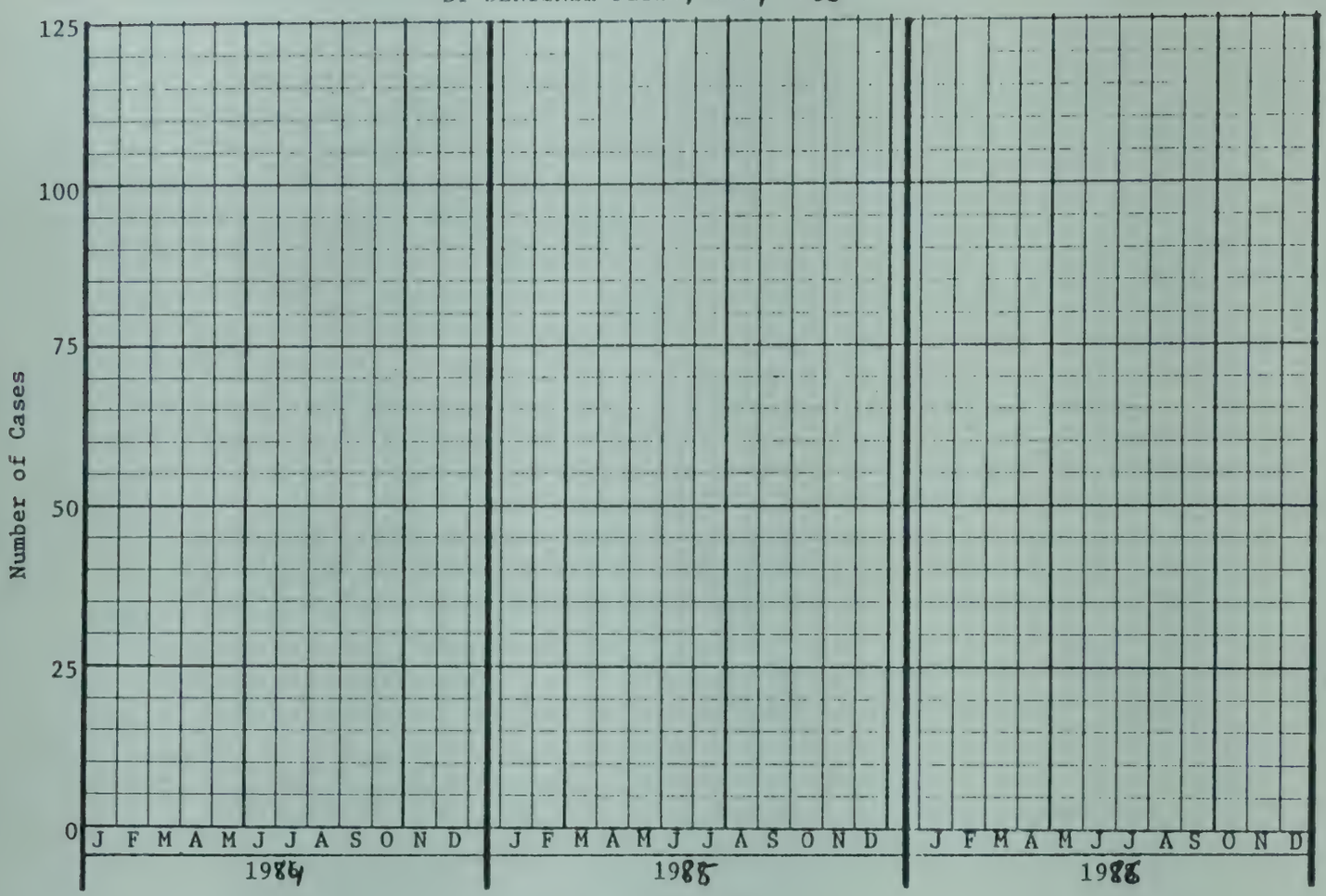
Worksheet for Exercise

1. a.



b.

NUMBER OF CASES OF MEASLES REPORTED PER MONTH
BY SENTINEL SITES, 1984-1986



c.

3.

Discuss your answers with a course manager when you have completed this exercise.

Exercise H

Instructions: Read the following paragraph and examine carefully the estimated rates of diseases given at page 50. Answer questions 1 through 3.

Your district has a population of 13.5 lakhs. The birth rate is 33/1000 and IMR 105/1000 live births. The coverage of pregnant women with TT2 in your district is 60% and of infants with DPT 3 and OPV 3 - 65% and 80% with measles.

Question 1 How many cases of neonatal tetanus, poliomyelitis, pertussia and measles you would expect assuming the above coverage to be correct?

Question 2 How may cases you would expect if there was no immunization of pregnant women?

Question 3 The reported number of cases is far below your estimates. What would you do to improve surveillance?

9.0 REPORT DATA

After you have analyzed the data for the previous reporting period, prepare the regular surveillance report and send it to the state and national levels.

It is essential that the report be sent promptly after the end of each reporting period.

The report should reach the national office by the 10th of the next month. If any investigations have been carried out, a separate note may be added.

5.0 PROVIDE FEEDBACK

The term "feedback" refers to:

* commenting to the local supervisors of vaccination activities upon the promptness, completeness and accuracy of their surveillance reports.

* inform them of the effectiveness of the vaccination activities in meeting the disease-reduction objectives in the region.

* offering information which might be helpful to them in solving problems (for example, tell them how the staff at one health centre solves a common problem).

* congratulating them on doing a good job or encouraging them to do a better job.

5.1 REASONS FOR PROVIDING FEEDBACK

Providing feedback is essential to keep staff motivated to achieve high levels of immunization coverage and motivated to collect accurate and

complete data on the occurrence of the target diseases. Health centre personnel need to see that the information they report is important. They need to know that the reports are actually used in order to evaluate the effectiveness of the immunization activities, and that they are not just filed away and forgotten.

Health centre personnel need to receive feedback, positive or negative, without delay. If health centres are reporting promptly at the beginning of each reporting period, they need immediate feedback in order to encourage them to continue to submit reports on time. If health centres are not reporting promptly at the beginning of each reporting period, they need immediate feedback in order to encourage them to start sending their reports in on time.

5.2 METHODS OF PROVIDING FEEDBACK

* Use the monthly meeting to discuss the reports.

* Visit the PHCs and discuss the reports.

* Write letters if necessary.

UNIVERSAL IMMUNIZATION PROGRAMME

MONTHLY REPORT

DIST/MC CODE NO: | | | | | | | | |

Month _____ 198...

STATE _____

DISTRICT _____ Medical College _____

No. of reporting units _____ Urban _____ Rural _____

No. of reports received _____ Urban _____ Rural _____

A. SURVEILLANCE

Disease	Number Reported			
	For the month		Cumulative since April	
	Cases	Deaths	Cases	Deaths
Diphtheria				
Pertussis				
Tetanus neonatorum				
Tetanus (others)				
Poliomyelitis (acute)				
Tuberculosis (childhood)				
Measles				
Typhoid fever				

B. VACCINATION PERFORMANCE

	Vaccine	Dose	No. of Beneficiaries		Cumulative since April	
PREGNANT WOMEN	TT	1				
		2				
		b				
			UNDER 1 YEAR	OVER 1 YEAR	UNDER 1 YEAR	OVER 1 YEAR
CHILDREN	D P T (6 wks - 12 months)	1				
		2				
		3				
	18-24 months	b				
	Polio (6 wks - 12 months)	1				
		2				
		3				
	18-24 months	b				
	B C G (0 - 12 months)	1				
	Measles (9-15 months)	1				

	Vaccine	Dose	No. of Beneficiaries	Cumulative since April
CHILDREN	DT (5 Years)	1		
		2		
		b		
	Typhoid (5 Years)	1		
		2		
	TT (10 Years)	1		
		2		
	TT (16 Years)	1		
		2		

C. VACCINE SUPPLY (no. of ~~doses~~ Vials)

Vaccine	Stock in hand (Beginning of month)	Received	Used	Balance (End of month)
D P T				
Polio				
B C G				
Measles				
TT				
DT				
Typhoid				

D. REFRIGERATORS (NO.)

District Hdq. Total No. available _____ Total No. installed _____ Working _____

PHCs Total No. available _____ Total No. installed _____ Working _____

DEEP FREEZERS (NO.)

District Hdq. Total No. available _____ Total No. installed _____ Working _____

ILRs (NO.)

District Hdq. Total No. available _____ Total No. installed _____ Working _____

PHCs Total No. available _____ Total No. installed _____ Working _____

E. UNTOWARD REACTIONS reported Abscesses _____ Others _____

DISTRICT HEALTH OFFICER/
Prof of PSM/Pead.....Medical College

DATE:

To

1. Assistant Commissioner (Immunization) Department of Family Welfare
   Ministry of Health & Family Welfare Nirman Bhavan, New Delhi-110011
2. State EPI Officer

FORM FOR THE LAMENESS SURVEY

Page No._____

Surveyor:_____ Cluster No._____ Date:_____ Locality:_____

Household number in cluster	1	2	3	4	5	6	7	8	9	10	11	12		Total
1. How many children are below 5 years of age in this household? If no children, put "0" and go to the next household														
2. Is there any child who is lame? If yes, put how many children and line list these in the attached form. If none, put "0" and go to the coverage form.														

Household number in cluster	13	14	15	16	17	18	19	20	21	22	23	24	Total
1. How many children are below 5 years of age in this household? If no children, put "0" and go to the next household.													
2. Is there any child who is lame? If yes, put how many children and line list these in the attached form. If none, put "0" and go to the coverage form.													

LIST OF LAME CHILDREN (UNDER 5 YEARS)

Surveyor: _____ Cluster No._____ Date:_____Locality:_____

Sr.No.	Name of Child	Address	Age/ date of birth	Year of onset	Immuni. Status	Probable/ polio	Other
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							

PROBABLE POLIOMYELITIS: History of Acute febrile illness
History of abrupt onset of weakness or paralysis of the leg(s), and/or arm(s) following fever; no progression of paralysis after the first 3 days and that without known trauma; ~~wit~~paralysis was not present at birth or associated with various injuries or mental retardation.

ANNUAL INCIDENCE RATE OF POLIOMYELITIS PER 1000 CHILDREN 0 TO 4 YEARS (Based on sample surveys - 1981-1982)

State/UT	Incidence Rate per 1000 children	
	Rural	Urban
Andhra Pradesh	1.7	1.4
Gujarat	2.5	2.2
Haryana, Punjab, Chandigarh	3.1	1.7
Karnataka, Goa	1.2	1.2
Madhya Pradesh (Bhopal & Jabalpur Divisions)	1.9	1.7
Maharashtra	1.4	1.3
Orissa	0.8	0.7
Rajasthan (Jaipur Div.)	3.1	2.5
Tamil Nadu & Pondicherry	1.9	2.1
Uttar Pradesh (Allahabad Division)	2.3	1.6
West Bengal	0.8	1.0
Delhi	-	1.6
INDIA	1.7	1.6

ANNUAL NEONATAL TETANUS MORTALITY RATE PER 1000 LIVE BIRTHS (Based on sample surveys - 1981-1982)

State/UT	NNT Mortality Rate	
	Rural	Urban
Andhra Pradesh	6.8	2.7
Bihar	11.3	5.3
Gujarat and D&N Haveli	5.8	1.9
Haryana, Punjab and Chandigarh	8.4	3.1
Karnataka & Goa	5.1	1.6
Kerala	2.0	1.9
M.P. (Bhopal & Jabalpur)	20.4	1.4
Maharashtra	4.7	4.9
Orissa	8.6	2.0
Rajasthan (Jaipur)	13.5	3.4
Tamilnadu & Pondicherry	4.9	0
UP (Allahabad)	66.7	15.3
West Bengal	11.9	0.5
Delhi	-	1.0
All India	13.3	3.2

Retrospective Analysis of Data from Sentinel Centres

Sentinel Centre _____

District _____

State _____

DISEASE

Year	Total Paed. attendance	No.of cases	Age <1yr	1-2yr	>2yr	Vaccination Status Not Vacc.	Vacci.	N.K.

*If possible non-residents should be excluded.

Reporting Form from Sentinel Centres

Sentinel Centre_____
District_____
State_____
Month_____ Year _____

DISEASE

	Vaccination Status		
	Vaccinated*	Not vaccinated	Unknown
<6 months			
7-12 months			
12-23months (<2 years)			
2-5 years			
+5 years			
Total			

* Vaccinated children should have received:

1 dose for measles and Tuberculosis] last dose received at
2 doses for tetanus, diphtheria] least 15 days prior to
3 doses for polio and pertussis] the onset the onset

NOTE: Do not include a case of poliomyelitis if history of onset is 3 months or more. All cases of brochopneumonia or severe diarrhoea who give a history of measles or pertussis one month prior to illness should be included under measles or pertussis.

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